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The Rise in Low-Income Rates Among Immigrants in Canada

by Garnett Picot and Feng Hou

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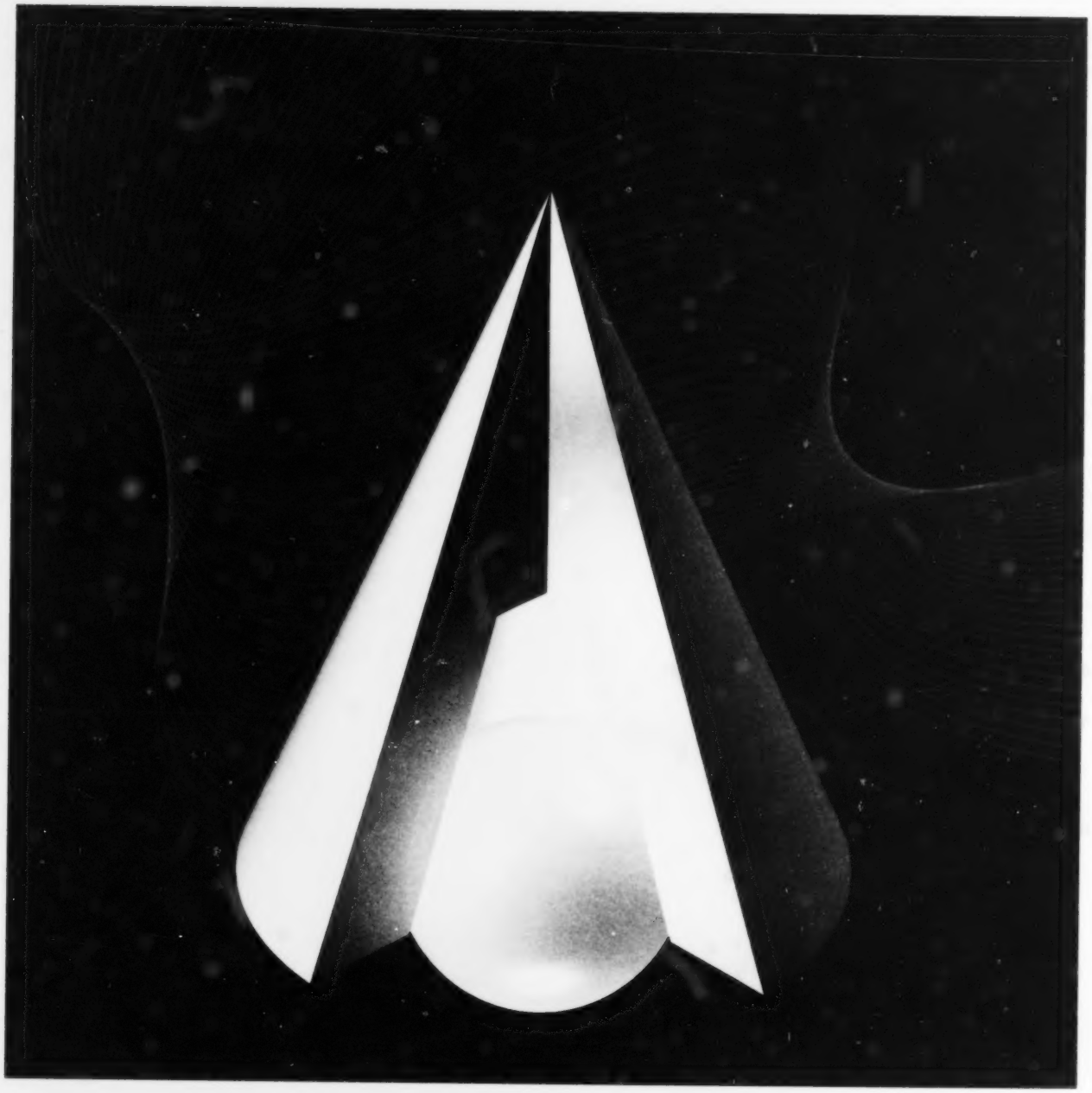

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The Rise in Low-Income Rates Among Immigrants in Canada

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ABSTRACT

This study uses census data to focus on low-income among immigrants, and asks a number of questions: (1) have low-income rates increased among successive cohorts of entering immigrants, both in absolute terms and relative to the Canadian born (they have), (2) is this increase due to changes in their characteristics (e.g. education, age, source country, language etc.), (3) do low-income rates fall as new immigrants acquire Canadian experience, and are there signs that low-income rates fall faster among the more recent entering cohorts with the higher entry level rates, resulting in some "catch-up", and (4) in the major Canadian cities, to what extent was the deterioration in the city level low-income rates during the 1990s concentrated among immigrants? The analysis covers the period from 1980 to 2000, and focuses on change between 1980 to 1990, and 1990 to 2000, years that are roughly at business cycle peaks.

The study finds that low-income rates among "recent" immigrants (in Canada for less than five years) almost doubled between 1980 and 1995, and then fell during the strong recovery of the late 1990s. However, when focusing on outcomes at business cycle peaks (1980, 1990 and 2000) to establish comparable long-term trends, low-income rates rose continuously for each successive cohort of immigrants. Furthermore, the gap at entry in their low-income rate relative to the Canadian-born also rose over the 1980-2000 period. The changing composition of "recent" immigrants with respect to language, source country, family type and age accounted for, at most, half of the rise in the low-income rate among this group, and likely substantially less than that. Most of the increase was a result of the widespread rise in low-income among recent immigrants in all age groups, family types, language groups, education groups, and most of the more significant (numerically) source regions, notably Africa and the Asian source regions. The peak to peak rise in the low-income rate between 1980 and 2000 was not restricted to recent immigrants, and was observed (to a lesser extent) among immigrants who had been in Canada for up to 20 years.

Low-income rates among immigrants tend to fall with time spent in Canada. Furthermore, among the more recent entering cohorts with the higher low-income rates at entry, the rate of decline is faster. There is evidence of a "catch-up" (to earlier cohorts) among the more recent entering cohorts. However, low-income rates remain higher among immigrant cohorts of the late 1980s and early 1990s than among their counterparts in the 1970s (comparing groups with a comparable number of years in Canada).

The rise in the low-income rates in the three major Canadian cities, and in Ontario and B.C. during the 1990s in particular, was largely concentrated among the immigrant population. Basically, low-income rates have been falling over the past two decades among the Canadian born, and rising among immigrants. A discussion of the possible determinants of the trends mentioned above is included in the literature review and the conclusion.

Keywords: poverty, low-income, immigrants, assimilation.

1. Introduction

Poverty and the economic performance of immigrants are both important social issues in Canada and each has separately stimulated a substantial body of research literature. Yet few studies focus on issues related to low-income among immigrants.

The Canadian poverty literature tends to focus on groups that traditionally have a disproportionate share of poverty, including children, lone-parent families, the elderly; and more recently, on minority groups such as Aboriginal peoples, racial minorities and persons with disabilities. Immigrants, particularly recent arrivals, are also recognized as a group at risk of experiencing higher levels of low income. A U.S. study suggests that the growth in immigrant-related poverty accounts for 75 percent of the total increase in the size of poor population between 1989 and 1997 in the United States (Camarota, 1999). Since we have a much larger annual in-flow of immigrants relative to total population and a larger proportion of foreign-born population than the United States (Citizenship and Immigration Canada, 2001; Smith and Edmonston, 1997), trends in immigrant low-income may be even more important for Canada. In 1996, immigrants accounted for 17.6 percent of the Canadian population, compared with 9.3 percent in the U.S.

Just as the poverty literature has mostly ignored immigrant-related poverty, studies on the economic performance of immigrants have largely ignored family welfare issues, and have been primarily confined to immigrants' earnings, labour market activities, and use of social transfers. Since these studies often cover only a specific segment of immigrant population (e.g., employed immigrants) or a specific aspect of immigrants' economic adjustment, they do not provide an overall picture of immigrants' economic circumstances and economic welfare. This study of low-income among immigrants is intended to help fill that gap. Low-income status is a simple yet comprehensive measure that reflects the joint effect of all income sources, income distribution, and the demographic structure of a population.

This paper uses primarily census data to contrast the trends in the low-income rate of immigrants with those of the Canadian-born. We concentrate on the years 1980, 1990 and 2000, all of which are business cycle peaks (1990 was close, as 1989 is often considered the peak). This is important, as low-income rates, both relative (to Canadian born) and actual, are influenced by the position in the business cycle. We are seeking longer term, structural trends, not changes due to cyclical fluctuation. We first focus on low-income trends at time of entry, that is, among *recent* immigrants in Canada for less than five years. Although declining during the economic recovery of the late 1990s, peak-to-peak over the past two decades, low income rates have risen among entering immigrants, while falling among the Canadian born population. In 1980 recent immigrants had low-income rates 1.4 times that of Canadian born, by 2000 they were 2.5 times higher, at 35.8%. This deterioration was widespread, affected most types of entering immigrants, including those: (1) with all levels of education, (2) who spoke an official language as well as those who did not, (3) from all age groups, and (4) in all family types (except for single parent families, among whom the rate has always been extremely high), and (5) from most source regions, although the rise in low-income was most pronounced among immigrants from the Asian regions, Africa and Southern Europe.

There has been a significant change in the characteristics of immigrants entering Canada over the past twenty years. They are more likely to come from Asia, Africa and South and Eastern Europe, and less likely from Europe, the U.S. and the Caribbean. In terms of the effect on low-income rates, the net effect of this redistribution of source regions is not clear. Some of the newer source regions have had above average low-income rates (thus tending to drive up the aggregate rate as these numbers increase), but others have had below average rates. Furthermore, the most rapid rise in the low-income rates occurred among immigrants from source regions with the greatest increase in the share of immigrants. This correlation makes it difficult to separate changes in composition from changes in "within" group rates. The results suggest that changes in source country had a small positive effect on the immigrant low-income rate, but this result is imprecise.

Conversely, education levels among immigrants have been rising, tending to reduce their low income rates. A regression decomposition analysis indicates that between 1980 and 2000, likely substantially less than one-half of the rise in the entry level low-income rate (immigrants in Canada less than 5 years) was associated with the change in the composition of recent immigrants by age, education, language, source region, and family structure. Most of the increase in the rates was observed "within" groups defined by these characteristics.

The rise in low-income rates over the past two decades was not confined to recent immigrants (although it was the highest among this population); it was observed among other immigrant groups who had been in Canada for up to 20 years. Nonetheless, as any given immigrant cohort acquires experience in Canada, their low-income rate falls. In particular, among more recent 1990s immigrant cohorts, their relative (to Canadian born) and actual low-income rates fell faster than was the case for earlier cohorts. There is evidence that the more recent cohorts with the very high entry level low-income rates do "catch-up" to some degree to earlier cohorts. After 12-16 years in Canada, the late 80s entering cohort had caught up with the early 80s entering cohort (i.e. had similar low-income rates after 12-16 years, although they had higher entry level rates). Similarly, the early 90s entering cohort had caught-up to the late 80s cohort after 7 to 11 years in Canada, although they had much higher levels of low-income upon entry to Canada. This pattern is consistent with recent evidence on employment earnings from Green and Worswick (2002). It remains to be seen if the most recent entering cohorts, with very high low-income rates at entry, will catch-up to earlier cohorts. In spite of this evidence of a "catch-up", low-income rates after any given time in Canada remain much higher among the late 80s and 90s cohorts than among the 70s entry cohorts.

Finally, the effect of the deterioration in the low-income position of immigrants on the aggregate low-income rate has, of course, been concentrated in the regions and cities with relatively high immigrant populations. For example, in Toronto, immigrants bore the brunt of the change in that city's low-income rate. Over the 1990s (1990 to 2000) the city's low-income rate rose 1.9 percentage points. All of this increase was associated with deteriorating outcomes among immigrants, which tended to increase the city's low-income rate by 2.8 percentage points. Outcomes among the Canadian born, among whom low-income rates were falling, tended to reduce the aggregate rate by 0.9 percentage points. Similar patterns are observed for Montreal and Vancouver, and hence, Ontario and B.C. Aggregate low-income trends in the Atlantic region

and the Prairie Provinces are less associated with changing outcomes for immigrants, simply because a smaller share of the population are immigrants.

Low-income rates did fall for both immigrants and Canadian born during the strong economic expansion of the late 1990s as one would expect. However, when focusing on longer term trends by comparing business cycle peaks, in the aggregate low-income rates rose among immigrants, particularly among "recent" immigrants, and fell among the Canadian born. There are signs that some "catch-up" is occurring among the more recent cohorts with the very high entry level low-income rates.

2. *Factors Affecting Immigrant Low-income: A Literature Review*

Knowledge about immigrants' earnings, employment patterns, use of welfare, and demographic structure will help us better understand the low-income trend among immigrants. Employment earnings is the most studied area of immigrants' economic adjustment in Canada (Swan, 1996). Both U.S. and Canadian studies using data collected in the 1970s suggest that newly arrived immigrants generally have lower earnings than comparable non-immigrant workers, but their initial earnings gap narrows as they adjust to the labour market in the receiving society[1] (Carliner, 1981; Chiswick, 1978; Meng, 1987; Tandon, 1978).

Research results using data collected in the early 1980s, however, seem to indicate an overwhelming trend of declining earnings among successive waves of immigrants relative to the Canadian-born. Although these are not consistent findings regarding a slowdown in the assimilation rate[2], newer waves of immigrants face a greater initial earnings deficiency, one that may take much longer to overcome[3] (Abbott and Beach, 1993; Bloom and Gunderson, 1991; Borjas, 1993; Fagnan, 1995). The entry-cohort effect also varies with national origin groups. Immigrants from the United States and Europe are much less disadvantaged in employment

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1 For instance, using the 1973 Canadian National Mobility Survey, Meng (1987) finds that immigrant males had an earnings disadvantage of 15% one-year after immigration, the gap diminishes after about 14 years.

2 Abbott and Beach (1993) analysed the 1973 Job Mobility Survey and found that immigrants' earnings relative to non-immigrants did not increase as they stayed longer in Canada. By comparison, based on the changes in the coefficient of years-since-immigration in cross-sectional earnings function models between two censuses, Chiswich and Miller (1988), Bloom and Gunderson (1991), and Fagnan (1995) found an increase in assimilation rates in the 1970s and early 1980s. However, assimilation rates estimated in cross-sectional models may reflect both immigrant labour market progress and the effect of the average difference in unmeasured factors across successive entry cohorts (Borjas, 1985; Bloom and Gunderson, 1991). To address this issue, Baker and Benjamin (1994) used the 1971, 1981 and 1986 census data and considered assimilation in three different ways: a fixed-cohort approach to compare the cross-census earnings of an immigrant cohort, a fixed-years-since-immigration approach to compare the earnings differentials of immigrants with similar years in the country across two censuses; and a third approach to compare earnings growth of immigrants and non-immigrants. They found uniformly small rates of assimilation for most cohorts in the study period.

3 The estimates by Bloom and Gunderson (1991) based on the 1971 Census data indicate immigrant men earn about 7 percent less than comparable non-immigrants when they first arrive and they need about 13 years to narrow the gap to zero. By comparison, similar estimates based the 1981 Census data indicate that new arrivals of immigrant men earn 16.6 percent less than non-immigrants and it would take 21.6 years to catch up. Chiswick and Miller (1988) found similar results from the 1971 and 1981 census data.

earnings than those from Africa, Asia, and Latin America (Borjas, 1991; Bloom, Grenier and Gunderson, 1995).

The earnings differentials by national origin of immigrants has led some researchers to suggest that the shift of national origin composition of immigrants from Europe and United States to the Third World countries primarily or at least partially contributes to the falling earnings of each successive cohort of immigrants (Borjas, 1991). For instance, Baker and Benjamin (1994) estimated that the changing mix of source countries accounted for 30 to 50 percent of the decline in the earnings of the post-1970 immigrant cohorts in Canada. Immigrants from non-traditional sources might have lower earning potentials than those from the U.S. and Europe because they have less transferable skills and credentials, and face more discrimination in the labour market (Borjas, 1991; Bloom, Grenier and Gunderson, 1995).

Some studies using data from the late 1980s questioned whether earnings potentials among successive cohorts of new arrivals continued to decline. Based on the 1991 Census, Grant (1999) found that immigrants arriving in the late 1980s achieved a similar level of entry earnings differentials to those arriving in the early 1980s, although lower than those who came in the late 1970s. Furthermore, immigrants arriving in the late 1980s were experiencing a higher assimilation rate than those arriving in the early 1980s. From their analysis of eleven consecutive cross-sections (1981-1992) of data from the Survey of Consumer Finances, McDonald and Worswick (1998) found that recent immigrant cohorts actually experienced a smaller earnings gap than earlier cohorts. More importantly, they indicated that immigrants' rate of earnings assimilation is sensitive to macroeconomic conditions. This observation echoes a view by Bloom and Gunderson (1991) who suggest that the growth in immigrant earnings is primarily attributable to economic forces that affect both immigrants and non-immigrants. In addition, McDonald and Worswick (1998) illustrated that more recent immigrants were more negatively affected by the two recessions of the early 1980s and early 1990s than earlier cohorts or the Canadian-born.

Results from the 1996 Census data provided further support for the notion that macroeconomic conditions affect immigrants' relative economic performance. Reitz (2001) found that the earnings ratio of the most recent male immigrants (0-5 years in Canada) to their Canadian-born counterparts declined from 0.796 in 1980 to 0.656 in 1985, then increased to 0.694 in 1990, but declined again to 0.600 in 1995. However, Reitz suggested that fluctuations in macroeconomic conditions could not fully explain the general downward trend in immigrants' economic performance. He demonstrated that at least two other factors were at play: immigrants' relative advantage in educational levels has declined due to rising levels of Canadian-born education; and immigrants did not benefit to the same extent as the Canadian-born from increases in education. In more recent work, Green and Worswick (2002) ask whether the decline in earnings among recent male immigrant cohorts are not simply a reflection of the general decline in earnings observed in Canada for all labour force entrants, particularly young males. They find that 40% of the decline in entry level earnings between the early 80s and mid 90s *male* immigrant cohorts can be accounted for by the general decline in labour market outcomes for labour force entrants. An additional 40% of the decline they found was associated with decreasing returns to experience among entering immigrant cohorts. In addition, they observed considerable catch-up across

cohorts, as earnings gains over time in Canada were much faster among cohorts with the lowest entry level earnings.

Studies on immigrants' earnings differentials are normally restricted to those with full-time employment. However, immigrants' total earnings also depends on their individual and family employment patterns. Overall, immigrants' employment patterns can partially compensate their deficiency in full-time earnings relative to the Canadian-born. As a whole, immigrants' labour force participation rate is similar to that of their Canadian-born counterparts (Badets and Chui, 1994; Beaujot, et al., 1988; Swan, et al., 1991; Citizenship and Immigration Canada, 2001). Among those who are in the labour force, immigrants generally experience less unemployment than comparable Canadian-born (McDonald and Worswick, 1997; Thomas and Rappak, 1998). But there is a downward trend among recent immigrants. Reitz's (2001) data show that the most recent arrivals (5 years or less in Canada) had an employment rate similar to the Canadian-born in 1981. By 1996, the most recent male and female immigrants had an employment rate 20% and 29% lower than their Canadian-born counterparts. In the 1980s, recent immigrants' family employment patterns tended to narrow the gap in their family earnings relative to non-immigrant families. Recent immigrant women were relatively more successful in the labour market than immigrant men, and immigrant wives contributed more to family earnings than their non-immigrant counterparts (Baker and Benjamin, 1997; Beach and Worswick, 1993; Worswick, 1996 and 1999). By 1996, however, recent immigrant women had a larger gap in the employment level (compared to Canadian-born) than recent immigrant men, even though among the employed, earning differentials with the Canadian-born were still smaller among recent immigrant women than among recent immigrant men (Reitz, 2001).

In addition to employment earnings, social transfers are another income source that is particularly important to the low-income population. Immigrant families on average tend to receive fewer government transfers as a whole (Basavarajappa and Halli 1997), although households headed by working-age recent immigrants have a higher percent receiving government transfers and a larger amount of transfer per receiving household than compatible non-immigrant households (Citizenship and Immigration Canada, 2001). As a study based on 1986 and 1991 data shows, immigrants, regardless of length of residence in Canada, participate less in unemployment insurance and social assistance than the Canadian-born, especially after controlling for eligibility to these programs. On the other hand, immigrants' participation in these programs grows with years in Canada[4]. More recent cohorts of immigrants tend to use more social transfers than earlier cohorts, holding years in Canada constant (Baker and Benjamin, 1995a and 1995b). However, Crossley, McDonald and Worswick (2001) replicated the study by Baker and Benjamin (1995a) on 13 years of the Canadian Survey of Consumer Finances, but did not find that immigrants assimilated toward greater receipt of benefits. There are significant differences in receiving social transfers across source regions and immigrant classes: immigrants from non-traditional source countries receive more social transfers than other immigrants, and refugees and family class immigrants receive more than independent immigrants (de Silva, 1997; Lui-Gurr, 1995).

[4] Baker and Benjamin (1995a and 1995b) used data from the 1986 and 1991 Survey of Consumer Finances. In contrast, Thomas and Rappak (1998) used data from the 1994 Survey of Labour and Income Dynamics and found immigrants receive more in social assistance and more in workers compensation than the Canadian-born.

Accounting for income from all sources, recent immigrants tend to have a lower average total income than the Canadian-born population (Basavarajappa and Halli, 1997; Beaujot, et al., 1988; Citizenship and Immigration Canada, 2001). The gap has also been increasing. For instance, the most-recent immigrant men and women with income had an average total income about 20% and 15% respectively lower than the Canadian-born in 1980 (Beaujot, et al., 1988). By 1995, their total income became 41% and 37% respectively lower than the Canadian-born (Citizenship and Immigration Canada, 2001).

This decline in average total income among recent immigrants relative to the Canadian-born likely results in an increased relative probability of falling into low-income. The literature seems to suggest that recent immigrants are experiencing an increasing prevalence of low-income compared to non-immigrants. The low-income rate of economic families headed by immigrants who arrived within 5 years was about 20% higher than that of their Canadian-born counterparts in 1970 (Richmond and Kalbach, 1980), 45% in 1980 (Beaujot, et al., 1988), and 82% higher in 1985[5] (Basavarajappa and Halli, 1997). The relative low-income rates increased not just among recent immigrants, but for immigrants as a whole as well. Data from the 1991 and 1996 censuses also showed that immigrants experienced a higher level of low-income than the Canadian-born (Citizenship and Immigration Canada, 1996; Kazemipur and Halli, 2001; Lee, 2000). The assimilation pattern that frequently appears in other aspects of immigrants' economic performance also holds here: low-income status is much more common among recent immigrants than among long-term immigrants[6]. By national origin, low income is generally higher among immigrants from non-traditional source countries.

Since the few previous studies on low-income among immigrants in Canada have focused on cross-sectional comparisons and used inconsistent measures[7], more research is needed to systematically identify the trend of differentials in low-income status between immigrants and the Canadian-born. In particular, it is not clear whether the differentials in low-income status for each successive cohort have increased over time. It is also not clear how a specific cohort of immigrants progresses over time regarding their differentials in low-income status with the Canadian-born.

Of particular interest to Canada's immigration policies is the relationship between the low-income trend among immigrants and the changes in the composition of recent immigrants in terms of national origin, and other socio-economic characteristics. This relationship is directly

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5 The corresponding numbers from 1991 and 1996 censuses were not found in the literature. These numbers are not fully compatible since the 1970 number included immigrants arriving in the census year and the year prior to the census, while the 1980 and 1985 numbers did not. Statistics Canada's LICOs were used in all the three studies, but the base years of the LICOs were different.

6 The oldest cohorts also tend to have a high level of low-income since they primarily consist of retired persons (Beaujot, Basavarajappa and Verma, 1988).

7 For instance, the three studies analysing the 1971, 1981, and 1986 census data (Richmond and Kalbach, 1980; Beaujot, et al., 1988) presented low-income rates for economic families and unattached individuals separately. In contrast, the three studies using later census data (Citizenship and Immigration Canada, 1996; Kazemipur and Halli, 2001; Lee, 2000) only presented low-income rates for all persons.

relevant to a general concern that immigrants from non-traditional source countries, who have formed the majority of more recent newcomers to Canada, might experience more cultural and economic difficulties in their settlement than immigrants from the U.S. and Europe.

Low-income among immigrants is not only relevant to immigrant selection and settlement policies, but also related to much broader issues of social cohesion/exclusion. Immigrants constitute a significant component of the Canadian population; high levels of low-income among immigrants might have a strong impact on changes in low-income rates in Canada as a whole.

3. Data, Measures and Methods

This study is based primarily on the 1981, 1986, 1991, 1996 and 2001 census 20% sample micro-data. The Survey of Consumer Finance (SCF) for 1980 to 1996, and the Survey of Labour and Income Dynamics (SLID) for 1996 to 2000 are used sparingly.

We excluded institutional residents, and immigrants who entered Canada in the census year, because their income information was not collected in the census. We also excluded immigrants who arrived in the year prior to the census year since they were instructed to report only income obtained in Canada in the census. Thus, most immigrants arriving in the year prior to the census would not have a full year income (Beaujot, et al., 1988; Fagnan, 1995). For the purpose of maintaining historical comparability, we excluded non-permanent residents[8] who were enumerated in and since the 1991 census, but not in previous censuses. We further excluded residents in the Yukon and Northwest Territories and on Indian reserves since the low-income cutoffs on which we determined low-income rates were not calculated for these regions.

We focus on business cycle peaks, hence focussing on longer term structural change in the relative low income of immigrants and non-immigrants. From the census we have income data for 1980, 1985, 1990, 1995, and 2000. The years 1980 and 2000 were both business cycle peaks, with unemployment rates of 7.6% and 6.8%.—1990 was close to the 1989 cyclical peak, with an unemployment rate of 8.1%. Hence, we tend to focus on the 1980-1990, 1990-2000 and 1980-2000 periods

We used Statistics Canada's low-income cutoffs (LICOs[9], 1992 base[10], after government transfers, before income taxes) to determine low-income status. Before tax LICOs are used

[8] Non-permanent residents include persons in Canada on student authorizations, employment authorizations, and Minister's permits, and as refugee claimants.

[9] LICOs take into account income versus expenditure patterns in seven family-size categories and in five community-size groups. Compared with the average household, a family at or below the LICO spends 20 percent more of its income on food, clothing, and shelter. Economic families are the basic units in deciding a family or individual's low-income status. A family is in low-income if its total income is below the LICO, while an individual is in low-income if his/her total family income is below the LICO.

[10] Statistics Canada has periodically re-based LICOs to reflect changes in family spending patterns. The most recent base year is 1992. Earlier base years include 1959, 1969, 1978, and 1986. To take inflation into account, the 1992 base cutoffs were adjusted for each census income year by applying the annual Consumer Price Index (CPI).

because the census only reports before tax income data. The LICO is adjusted only for changes in the consumer price index (CPI), and hence is a fixed cut-off over the various years examined in the study.

In calculating low-income rates by immigrant status, we treated Canadian-born children who were younger than 18 and lived in an immigrant economic family as immigrants[11].

To illustrate the extent to which changes in the aggregate low-income rates at the national, provincial, and census metropolitan area (CMA) levels were concentrated among immigrants, we decomposed changes in low-income rates into immigrant-related and non-immigrant-related components. For reasons mentioned earlier, we chose three different time frames for measuring changes in low-income rates; 1980-1990, 1990-2000, and 1980-2000.

We also used multivariate techniques to examine the impact of changes in the composition of recent immigrant population in terms of national origin, and other socio-economic characteristics on changes in low-income rates among immigrants. We applied both the Oaxaca-Blinder method and the Even-MacPherson approach (Even and MacPherson, 1994). The former uses an ordinary least-square (OLS) regression model to estimate the probability of being in low-income; the latter uses a logit model. The above two techniques all can decompose the change in the low-income rate into three components: due to changes in the characteristic(s), due to changes in rates, and a third component that is due to the joint effect of changes in characteristic(s) and rates. The third component reflects the extent to which low-income rate changes were primarily confined to certain subgroups that had large changes in their proportions in the total population. In most mean-coefficients analyses, the third component is usually combined together with the second and treated as the "unexplained component"[12]. But the third component is also partially attributable to changes in composition. This component is large in our study and it has important implications.

Of the two multivariate approaches, the Oaxaca-Blinder decomposition method can arithmetically decompose the overall changes in the low-income rate into components due to composition, due to rates, and due to the joint effect of composition and rates. Its limitation lies in the well-known problems of fitting OLS models for a dichotomous dependent variable. The Even-MacPherson approach is statistically more appropriate for a dichotomous outcome but lacks an algebraic formula to directly derive the contribution due to the joint effect of composition and rates (which is estimated in this decomposition as a residual term). Both multivariate approaches usually do not include all the interaction terms between independent

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[11] See Appendix 1 for a detailed comparison of results from the different definitions of immigrants.

[12] Suppose we have regression models $Y_1 = a + B_{1i}X_{1i} + E_1$ for group (time) 1 and $Y_2 = a + B_{2i}X_{2i} + E_2$ for group (time) 2. The difference in the means between Y_1 and Y_2 (ΔY) that can be attributed to the differences in the means between X_{1i} and X_{2i} is called "the explained" component in mean-coefficients analysis. The remaining portion of ΔY is called "the unexplained" components. However, the size of the "explained" component may vary greatly depending on whether B_{1i} or B_{2i} are used as weights (Blau and Graham, 1990). As we will show in Appendix 2, the differences in the "explained" components derived from B_{1i} or B_{2i} equals the joint effect of means and coefficients.

variables in their model construction. Consequently, they may incorrectly estimate the contribution of compositional characteristics when important interaction terms are excluded from the regression model.

In Appendix 2, we use examples to illustrate how each of the two techniques work and under what conditions that they yield identical results. We also show how to derive and interpret the contribution due to the joint effect of composition and rates. In the results reported here, we rely on the Even-MacPherson approach, since it is based on the more appropriate logistic regression (rather than OLS). Both techniques give very similar results, as noted in the appendix.

4. Results

Increasing Low-Income Among Entering Immigrant Cohorts

The first section focuses on the rise in both the actual and relative (to Canadian born) low-income rate among successive cohorts of "recent" immigrants (in Canada for less than 5 years).

Immigrants in Canada less than 5 years had a low-income rate only 1.4 times that of Canadian-born at the 1980 cyclical peak. By 1990, the rate for this group was more than twice that of Canadian-born (2.1), and by the 2000 cyclical peak, it was 2.5 times higher (Table 1). These are census results, and those from SCF/SLID are similar (Table 1). The business cycle peak-to-peak change (that is, from 1980 to 1990 to 2000) in the low-income rate among recent immigrants was an upward trend. It rose from 24.6% in 1980, to 31.3% in 1990 and 35.8% in 2000. This rise was not associated with poorer economic conditions in 2000, compared to earlier business cycle peaks. In fact, the unemployment rate in 2000, at 6.8%, was lower than that observed in 1990 (at 8.1%) or 1980 (7.5%). Economic conditions were, by historical standards, very robust at the end of the 1990s. Furthermore, this rise in the low-income rate of recent immigrants was not associated with a general increase in low-income in Canada. Among non-immigrants, the rate *fell* from 17.2% in 1980 to 14.3% in 2000 (after transfer, before tax rate).

Figure 1 displays the rise in the relative low-income rate for immigrant groups by five-year period of immigration, and Figure 2 the actual rates. There was a significant decline in the low-income rate among recent immigrants between 1995 and 2000, falling from 47.0% to 35.8%. This improvement occurred during the strong expansionary phase of the business cycle, when the unemployment rate fell from 9.4% to 6.8% and hence does not necessarily represent a long-term trend. Low-income rates always decline during this phase of the business cycle. Relative to Canadian born, there was a slight improvement over the last half of the 1990s; the low-income rate of recent immigrants was 2.7 times that of Canadian born in 1995, and 2.5 in 2000. This improvement is also expected, as it is well-known that the relative economic position of immigrants tends to improve in expansions, and deteriorate in recessions (McDonald and Worswick, 1997, 1998). Using the approximate peak to peak change in the rates to determine long-term trends (i.e. 1980 to 1990 to 2000), the picture is one of a continuous deterioration in low-income rates among immigrants recently arrived in Canada.

Less than half of the rise in the low-income rates was associated with the changing composition of recent immigrants

Of course, the recent immigrant population was not the same in 1980 as it was in 2000 across dimensions such as language, age, education, source country, and family type. Some of the rise in the relative low-income rate could be accounted for by this change in composition. We start with region of origin. Entry cohorts were much more likely to come from East Asia (China, Korea, Japan, Hong Kong), South Asia (India, Sri Lanka, Pakistan), and Western Asia (Iran, Iraq, Lebanon, Afghanistan...) in particular in the late 1990s as compared to the late 1970s. About one-quarter of all "recent" immigrants originated from these three regions in 1980; by 2000 more than one-half did so. Increasing shares of immigrants also came from Africa and Eastern Europe. Immigrants were *less* likely to originate from the rest of Europe, the U.S. and the Caribbean in the late 1990s as compared to the late 1970s (Table 2).

It is difficult to know what effect this shift in the region of origin among recent immigrants would be expected to have on their low-income rates. If countries with declining shares had historically below average low-income rates, and those with increasing shares higher rates, then one would expect the shift in source regions to contribute to the increase in low-income rates. However, the picture is not that straightforward. Some of the newer source regions have higher than average low-income rates, such as East and West Asia. This likely reflects differences in language and education, and even if there are controls for these characteristics (as shown later in the paper) differences persist, likely due to cultural differences, education quality, and the extent to which employers recognize education credentials and experience in the Canadian labour market. But some of the newer source regions have below average rates, such as Eastern Europe and South Asia. Hence, the net effect of the changing distribution by source region on the aggregate low-income rate is unclear. We use mutivariate analysis to assess the effect in the next section.

Turning to language and education, almost two-thirds of recent immigrants in 2000 had a home language other than French or English, compared to 46% in 1980. This may tend to increase low-income rates at entry, as it may affect labour market outcomes. Changes in educational composition would tend to reduce low-income rates, as the educational attainment of entering cohorts was much higher among the late 1990 entrants than among those of the late 1970s (Table 2). Among the population 25-65, 42% had a degree in 2000, compared to 19% in 1980.

Using multivariate decomposition methods (Appendix 2), we examine the combined effects of changes in all the selected characteristics (source region, home language, education, family type, and age) on the change in low-income among recent immigrants. The decomposition assesses the effect of the following three factors on the *change* in low-income rate among the recent immigrant population: (1) the change in the composition of the immigration population (e.g., source region, language ability, educational level, etc.); (2) the change in the likelihood of being in low-income given a particular set of characteristics (e.g., people with a university degree are more likely to be in low-income in, say, 2000 than in 1980); (3) an interaction between (1) and (2), which is often small. However, the interaction effect can be large when some subgroups

experience both a large increase in their share of the total immigrant population and a large increase in their low-income rates. That is the case in the decompositions performed here.

To conduct the decompositions, logistic regressions are run for all "recent" immigrants for 1980, 1990 and 2000. The dependent variable has the value 1 if the individual is in low income, 0 otherwise. The independent variables included source region, home language, education level, family type and age. The results are in Appendix Table 3.1. The approach used to determine the size of each of the three effects (changes in composition, changes in the likelihood of being in low-income given a specific set of characteristics, and the interaction term) is described in Appendix 2[13].

We conducted the decomposition for the periods 1980 to 1990, 1990 to 2000, and 1980 to 2000. As Appendix Table 2.1 to 2.3 shows, the decomposition results from the Oaxaca-Blinder method and Even-MacPherson method are very similar in most cases. In the following discussion, we focus on the results from the Even-MacPherson method since it is more statistically appropriate for the dichotomous dependent variables used in the study. The summary results are presented in Table 3.

Over the entire 1980 to 2000 period, of the 11.2 percentage point increase in the low-income rate, about one-half (48%) was due to changes in the increased likelihood of being in low-income with a given set of characteristics, such as a given level of education, source country, age, etc. That is, at least half of the change was accounted for by change in the regression coefficients, not change in the Xs (which represent changing composition). But the main feature of this decomposition is the very large interaction term, which is affected by both increasing shares and increasing probabilities of low-income given particular characteristics. Over the two decades, it accounted for 64% of the rise. This large interaction term makes interpreting the results in any precise manner very difficult. It is not possible to allocate this term to either of the two main factors (i.e. changes in composition or changes in rates given particular characteristics), since both factors are involved. The high correlation between the change in share of immigration and the rise in the "within" group rate was noted earlier.

The change in composition component alone actually contributed to a decline in the low-income rate, mainly because of the increase in educational attainment, which tends to reduce low-income. However, as noted, much of the composition effect would be captured in the interaction term. We cannot allocate the interaction term to one main factor or the other. Hence, we find that between zero and one half of the rise in low-income was related to composition (i.e. -12% if we ignore the interaction term, and 52% if we allocate it entirely to composition factor, a very unlikely event). Thus, between one-half and all of the rise was associated with increasing low-

[13] As explained in Appendix 2, the results of multivariate decomposition methods may be sensitive to whether the model includes the interaction terms among independent variables. We included interaction terms, notably interacting education level with source country. It seems plausible that the effect of education on the likelihood of being in low-income varies among source countries. Education credentials from some countries (e.g. the U.S. and Western Europe) may well be of more value in the labour market than those from other countries. Some of these interaction terms were significant, notably the interactions between education and source country for the Asian regions (South Asia, Southeast Asia, East Asia). However, their inclusion resulted in only a very minor change in the decomposition results. Thus, they were excluded.

income rates *within* groups defined by education, source region, age, etc. Although unable to assign a precise share of the rise in the low-income rate to the changing composition, we can say that it accounted for less than half of the total increase, and that the rise in the rates "within" groups was a more significant determinant of the overall rise.

The rising low-income rates were widespread; observed in all education, age, and language groups, and family types, but only for some source regions.

The rise in low-income rates "within" groups was widespread. Low-income rates rose among recent immigrants in both language groups (whether their home language was English or French, or not), in all age groups, in all education groups, and in all family type groups (except single mothers, where the rate was extremely high in all periods, at around 73%).

Source region was the one dimension across which the rise was not widespread. The raw data (table 2) indicate that between 1980 and 2000, the low-income rate rose in seven of the source regions, remained more or less constant in four, and declined significantly in two (Southeast Asia and Western Europe). Of course, some of this rate change differential could be associated with differences among regions in the other characteristics mentioned earlier (age, education, family type, language). Hence, we produce "predicted" low-income rates based on the logistic regression model that holds the composition of immigrants fixed at the value observed for combined population of recent immigrants in both 1980 and 2000[14] (Table 4). The results are similar to those in the raw data[15]. The significant increases in low-income rates were observed among immigrants from most Asian regions (except Southeast Asia, which saw a decline in both the rate and its share of recent immigrants), Africa, and Southern Europe.

We were unable to include an "immigrant class" variable in the decomposition: refugee, economic, family, or other. This variable is not available in the census. Economic class immigrants have superior labour market outcomes to others[16] (Dougherty, 1999). Given the differences in economic outcomes among classes, a shift in composition by class would affect the aggregate low-income rate of recent immigrants. Some of this shift may be correlated with source

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[14] The regression model uses the pooled 1980 and 2000 recent immigrant population. The dependent variable is 1 if in low-income, 0 otherwise. The independent variable includes age, education, family type, language, source region as defined earlier, plus a dummy variable for year 2000, and this time dummy variable is interacted with all levels of all the dependent variables mentioned earlier. As noted, the composition of immigrants is fixed at the pooled 1980-2000 level.

[15] Even when controlling for these characteristics low-income rates may change for immigrants from a source country because Canadian firms may have been less likely to recognize their education credentials or foreign work experience in the recent past, because education quality may change, because of shifting domestic supply/demand balances in the occupations in which immigrants from these regions seek jobs, or a host of other reasons.

[16] For example, among the 1986 cohort of the most recent arrivals (during the past five years), the relative earnings of those employed (relative to all employed Canadian-born) of the economic class was 0.85 in the first year of entry, and rose to about 1.0 after 10 years. Among all other classes, relative earnings started at between 0.5 and 0.6, and rose to 0.8 to 0.9 after 13 years. Similar differences are noted in other cohorts, although most of the decline in relative earnings outcomes occurred among the economic class

country and education, and hence these variables may pick up some of the effect. How much of the effect is unknown.

It is therefore important to know to what degree there has been a shift in the composition of recent immigrants by class of immigrant. Figure 3 shows the distribution by class for the most recent arrivals (in Canada five years or less) for the census intervals covered by our analysis (1986 to 2001 census). There were no dramatic compositional shifts by immigrant class that are consistent with the steady rise of low-income rate among recent immigrants up to the mid-90s. The share that were in the economic class increased from about 37% in the five years prior to the 1986 Census, to 44% in the five years before the 1991 Census, and fell back to 41% before the 1996 Census. The major change occurred during the 1995 to 1999 period (recent immigrants in the 2001 census), when the share of economic migrants rose to about 54%. This tendency to accept a greater proportion of economic immigrants in the late 90s would, if anything, tend to decrease the low-income rate, all other things equal. Hence, if we were able to compare recent immigrants of "like" immigrant class over the period, within group (source country, education, etc.) increases in low income might have been even greater that what we observe. Not having the immigrant class variable means that, if anything, we have overestimated the tendency of compositional change to drive up the low-income rate.

Among recent immigrants, having a degree did not prevent the rise in the probability of being in low-income.

There has been much interest in the rise in demand for highly educated labour in the Canadian labour market, and the need to produce a more highly educated workforce in an era of the "knowledge based" economy. The more highly educated have always experienced superior labour market outcomes relative to the less educated (higher earnings and employment rates), resulting in lower low-income rates. Recent immigrants are no exception; the higher the level of education, the lower the low-income rate (Table 2). However, given the concern regarding the rising demand for more highly educated, and the resulting increase in the educational attainment of recent immigrants, one might have postulated that the brunt of the *increase* in low-income would be concentrated among the less educated population. This was not the case. Low-income rates rose for recent immigrants at all levels of education, but in the raw data, and the "predicted" rates in Table 4 (holding composition by age, education, family type, language fixed across all levels of education), the higher the level of education, the greater the increase. Among entering immigrants with less than high school graduation, the predicted low-income rate increased 24% between 1980 and 2000, among high school graduates, 50%, but for the university educated, it increased 66%.

The gap in the low-income rate between Canadian born and recent immigrants increased most for the highly educated.

In terms of low-income levels, among the Canadian born over the past two decades, outcomes improved for degree holders, and remained unchanged for the less educated. Among recent immigrants, however, if anything, outcomes deteriorated more for degree holders than the less educated. The result is that low-income rates of recent immigrants *relative* to Canadian born,

increased the most among the highly educated. This is in a sense controlling for overall economic conditions as they affected the majority of the workers in the country, the Canadian born.

Table 5 displays low-income rates for both recent immigrants and the Canadian born of various age groups who spoke an official language at home. Recent immigrants whose home language is something other than English or French are excluded from this table, in order to exclude the group for which language not education level, may be an important issue in economic assimilation. In this case, the *relative* rates increased fastest for the highly educated. For example, among men 25-40 (the prime age working population), in 1980 the relative rates were similar across education levels: recent immigrants had rates from 1.5 to 1.9 times that of their Canadian born counterparts. By the 1990s, relative rates for the less educated (less than high school) had changed little at around 1.5, but among those with a university degree, they had increased to 3.7. Among the older cohort of men (41 to 55) the results are even more striking, as the relative rate among degree holders rose to 6.4 times that of Canadian born, compared to 2.7 in 1980. Similar trends are observed for women. Overall, however, the rise in both the actual and relative low-income rates is somewhat lower for female than male recent immigrants.

When all recent immigrants (regardless of home language) are included, the results regarding change are very similar, although all rates (actual and relative) are higher (Table 6).

One might speculate that the rise in the actual and relative low-income rates was concentrated among university graduates in particular disciplines. The business cycle peaked in 2000, and it was just before the downturn in the information, communications and technology sector. The demand for technical and applied graduates was apparently high during the late 1990s to 2000, and hence this might have protected recent immigrants with such degrees from falling into low-income. In 2000, low-income rates were indeed lower among recent immigrant graduates in engineering, math and the physical sciences. They were in the 21% to 24% range, as compared to 27% to 30% for graduates in other disciplines. But the rise in the low-income rate was as great among graduates in these applied fields; the rate increased 64% for engineering graduates, and 20% for math and physical science graduates between 1990 and 2000, compared to 24% to 77% for graduates in other fields (Table 7).

And the low-income rate among recent immigrants from the applied fields *relative* to their Canadian born counterparts was higher than for most disciplines. Among engineering and applied science graduates recent, immigrants had low-income rates 4.6 times their Canadian born-counterparts in 1990 but by 2000 this had risen to 7.0, the highest relative rate among any discipline.

Increasing relative and actual low-income rates were observed among immigrants with more Canadian experience as well

Although the rise in low-income was most significant among relatively new immigrants to Canada, it was observed among those with more Canadian experience as well. Only immigrants in Canada for more than 20 years did not experience the rise in low income rates (comparing the business cycle peaks of 1980, 1990 and 2000). Their outcomes more clearly resemble those of

the Canadian born population, as their low-income rates actually fell significantly over the period. (Figure 2, Table 1).

There are signs of a "catch-up" for the more recent cohorts of immigrants as they acquire Canadian experience

Given the significant rise in low-income rates among more recent cohorts of entering immigrants, a key question relates to the speed at which the low-income rate falls with years spent in Canada. It is well known that earnings rise, both in actual and relative (to Canadian born) terms, as immigrants acquire Canadian experience (Chiswick, 1978; Grant, 1999). As immigrants improve their language skills, form networks in Canada, become more familiar with Canadian social and work norms, their labour market outcomes improve. As a result, low-income rates fall. This can be seen in Figure 4. Forming pseudo-cohorts, and tracking the low-income rate of immigrants through successive censuses as they acquire years in Canada, one observes a decline in the low-income rate relative to that of the aggregate rate for Canadian born. More importantly, the higher the relative gap at entry (between recent immigrants and Canadian born), the more rapid the decline in the relative (and actual) rate. Hence, the later cohorts of the late 1980s and 1990s with the much higher entry level rates do appear to be "catching-up" to their earlier cohorts. For example, in spite of experiencing a much higher entry low-income rate, after 12 to 16 years in Canada, the late 1980s cohort of entrants had caught up to the early 1980s cohort (i.e. their low-income rate had fallen to the same level as the earlier cohort) . Similarly, after 7 to 11 years in Canada, the early 1990s cohort had "caught-up" to the late 1980s cohort. This pattern fits with the Green and Worswick (2002) results. They observed that the more recent cohorts, with much lower relative earnings at entry, saw their earnings rise faster than earlier cohorts.

Of course, immigrants in different entry cohorts have different characteristics, and this could affect both the low-income rate at entry, and the rate of decline in the low-income rate once in Canada. This was discussed earlier with respect to the low-income rate at entry. More recent entering cohorts are more likely to be highly educated, come from non-traditional source regions (notably Asia), and less likely to have an official language (English or French) as their home language. To control for these differences among entering cohorts, we specify a logistic regression model where the dependent variable is 1 if the person is in low-income, and 0 otherwise. The independent variables include:

intercept
cohort identifier (i.e. for entering cohorts 95-99, 90-94, 85-89, 80-84, 75-79, 70-74, before 70)
years since entering Canada, and this variable squared
region of origin
home language
education level
family status
age group
interaction of cohort and years since migration
unemployment rate

The variables relating to the characteristics of the entering immigrants allow us to control for differences in these characteristics among cohorts. The variable "years since entering Canada" and this variable squared allow the low-income rate to vary non-linearly as immigrants acquire Canadian experience. The interaction of the "years in Canada" variable with the cohort identifier allows the rate of decline in the low-income rate (with years in Canada) to vary across cohorts. The unemployment rate accounts to some extent for economic conditions during the year the low-income rate is measured; it is the employment rate for the year prior to the census (e.g. the year 2000 for observations in the 2001 censuses). The sample is a pooled sample of observations for immigrants and non-immigrants for all five census, 1981 to 2001 inclusive. The regression results are provided in Appendix Table 3.3.

The predicted low-income rates for different entering cohorts, based on this model (Figure 4a), demonstrate that the higher the low-income rate at entry, the more rapid the decline (improvement) with years residing in Canada. The results suggest that for the 1970-1974 entering cohort, when low-income rates were similar to levels observed among Canadian born, there was only a very small decline with time spent in Canada. With successive cohorts, as entry level low-income rates rose (even though we have controlled for immigrant characteristics and the unemployment rate), the slope indicating the rate of decline in the low-income rate became increasingly negative. In particular, when entry level low-income rates rose dramatically for the 1990-1994 and 1995-1999 cohorts, the slope of the recovery became much more negative (for the 1990-1994 cohort), indicating substantial "catch-up". Finally, however, the low-income rates of the 1980s cohorts, with the higher entry level rate, remained above those of the 1970s cohorts, even after 10 to 15 years in Canada.

It should be noted that the dramatic catch-up for the 1990-1994 cohort occurred during a period of economic expansion. It is well-known that immigrants improve their relative economic position much more rapidly during expansionary periods, than periods of contraction or recovery (McDonald and Worswick, 1998). Macroeconomic conditions influence the rate at which the relative low-income rate falls. The dramatic decline in low-income among this cohort may or may not repeat itself during the slower economic (although still substantial) growth that has taken place since 2000.

Again one might speculate that immigrants from particular source regions might primarily benefit from this catch-up phenomenon during the late 90s. It might be that those from countries with language, social and work norms, and educational systems more similar to those in Canada would primarily benefit from the catch-up witnessed during the expansion. Such immigrants may have a labour market edge that allows them to take advantage of an expansionary increase in labour demand more than others. The evidence available here suggests that this is, in the main, not the case. Figure 5 suggests that in five of the six regions, significant catch-up is observed (i.e. among immigrants from all parts of Europe, Caribbean, South and Central America, and Asia). There is no catch up among recent cohorts of immigrants from the U.S., since there has really not been any deterioration in their relative outcomes. Only among Africans does the "catch-up" appear not to be clear. There may be large numbers of refugees in this group, and the manner in which they interact with the labour market is very different from other groups. While this

represents a very coarse analysis of variation among source countries, it suggests that source country differences regarding this phenomenon are not large.

Similar conclusions are reached when focusing on immigrants with different levels of education, and from the two language groups (speak an official language, or do not). The catch-up during the late 90s is observed among all groups (Figure 6).

Hence, just as the deterioration in low-income rates among recent immigrants was widespread, the catch-up observed during the recovery is widespread. This suggests that these trends are related to economic factors that, by and large, affect immigrants from the more numerically significant regions, language types, educational types,... etc., and are not related to what is happening to a particular group.

In the aggregate, low-income rates fell among Canadian born, and rose among most immigrant groups.

When comparing business cycle peaks to observe long-run trends, the low-income rate is rising for immigrants (except the very long-term) and declining for Canadian-born (Table 8). Even among the traditionally at risk groups such as seniors, single parent families, and families with young children the low-income rate among the Canadian born fell over the 1990s (between 1990 and 2000), while rising among immigrant groups. The result is that for regions with a large immigrant population, any deterioration in the low-income situation is increasingly concentrated among the immigrant community.

To focus on this issue, we assess the extent to which *changes* in the low-income rate of a city, region or Canada are accounted for by changes in the low-income trends among immigrants, or those among non-immigrants. A low-income rate for a city or province may rise because the proportion of the population that is recent immigrants is increasing (and they tend to have above average low-income rates), or because the low-income rates among the immigrant group itself is increasing. Both of these outcomes have been observed over the past two decades.

To determine the contribution of any group to the change in a region's low-income rate, we use the following simple formula:

$$\% \text{ contribution} = [r_{(i,\,y2)} * S_{(i,\,y2)} - r_{(i,\,y1)} * S_{(i,\,y1)}] / [R_{(y2)} - R_{(y1)}] * 100$$

where $r_{(i,\,y1)}$ is the low-income rate for immigrant group i in the year y1, and

$S_{(i,\,y1)}$ is immigrant group i's share of the population in the same year, and

$R_{(y1)}$ is the low-income rate for the population as a whole in the year y1.

The results differ depending upon the time period and region.

For Canada as a whole, over the past two decades, and from peak to peak in the business cycle, 1980 to 2000, the low-income rate (after transfer, before tax) fell by 1.6 percentage points. Changes in low-income rates and shares among *non-immigrants* tended to reduce the Canada rate by 2.6 percentage points (Table 9). This was partially offset by an increase of 1.0 percentage

points associated with both a rising share of immigrants in the population (contributing a 0.3 percentage point increase), and the rise in the low-income rate within immigrants groups (contributing 0.6 percentage points).

It may be that if one focused on particular high risk groups among the Canadian born that outcomes among some of these groups would also tend to put upward pressure on the low-income rate. We did not find this. In Table 9 results are presented for single-parent families, other young families, seniors, and all other Canadian born. In all cases outcomes for these groups tended to be associated with a small negative trend in the aggregate low-income rate. A group must be of significant size to have a significant effect on the aggregate low-income rate. Hence, even if there are other small groups (e.g. possibly the disabled) that have potentially increasing low-income rates, it is unlikely that they would affect the change in the aggregate rate in any significant manner. They are simply too small.

Of course, the larger the immigrant group as a share of total population, the greater the association between outcomes for that group and the changes in the regions aggregate low-income rate. Results similar to those above are presented for six regions of Canada, and the three largest cities, Toronto, Vancouver and Montreal (Table 10). In the Atlantic region, Manitoba and Saskatchewan, and Alberta, outcomes for immigrants do not have a significant effect on aggregate low-income changes, simply because immigrants constitute a relatively small share of the population. In cities like Toronto and Vancouver, however, the effects are substantial.

In Toronto, over the 1990s (1990 to 2000) the low-income rate rose by 1.9 percentage points. Outcomes among the Canadian born tended to reduce the aggregate rate by 0.9 percentage points, those among immigrants to increase the rate by 2.8 percentage points. Changes in both the recent immigrant population and those with more Canadian experience (particularly 6 to 10 years) contributed to the rise (0.5 and 1.6 percentage points respectively). The increase was related more to increases in low-income rates among immigrants (contributing a 1.8 percentage point increase) than with the fact that they constituted an increasing share of the population (0.8 percentage points).

Similar results are observed for Vancouver. The rate rose 3.1 percentage points over the 1990s, and outcomes for the Canadian born tended to reduce the rate by 1.7 percentage points, those of immigrants to increase the rate by 4.7 percentage points. In this case, deteriorating outcomes for both recent immigrants and those in the country for 6 to 11 years tended to increase the rate significantly (1.7 and 2.2 percentage points). As with Toronto, rising rates among immigrants in Vancouver was the main contributing factor (2.7 percentage points), although increasing shares of immigrants also contributed (1.5 percentage points).

Montreal displays a similar pattern. As a result, for these cities and the provinces of Ontario and British Columbia, deteriorating outcomes regarding low-income tend to have been concentrated among the immigrant population.

5. Summary and Discussion

Most research regarding the economic outcomes of immigrants has focused on labour market outcomes of individuals, primarily earnings, employment rates and participation rates. This research has contributed significantly to our understanding of what is happening to immigrant assimilation patterns, and to a lesser extent, why, as summarized in the introduction. Relatively little research has focused on economic welfare at the family level. The low-income rate is one measure of family welfare outcomes. It is influenced not only by changes in median or average earnings, and their numerous determinants, but also by changing earnings and income inequality, the availability and usage of social transfers, investment behaviour, and family formation patterns.

Low-income rates among recent immigrants declined during the strong economic recovery of the late 1990s, as one would expect. However, abstracting from business cycle fluctuations, immigrant low-income rates have been on a continuous upward long term trend over the 1980, 1990 to 2000 period (comparing peak to peak). This is true regardless of the number of years of Canadian experience (except for those in Canada for more than 20 years), although the highest levels and the most rapid growth in the low-income rate is among "recent" immigrants. And since low-income rates have been stable or slowly falling over this period (peak to peak) among the Canadian born, the *relative* (to Canadian born) low-income rate among immigrants increased.

Among *recent* immigrants, compositional changes in the characteristics of immigrants, including source region, home language, family type, education level and age, accounted for less than one half of the rise in the aggregate rate over the two decades. It is difficult to be more precise because of the high degree of correlation in the source regions and education level variables between the rise in the rate, and the rise in the share of the recent immigrant population. Generally speaking, the source regions that had the largest increase in their share of the recent immigrant population also tended to have the highest increase in the low-income rates (notably Africa, South Asia, East Asia and West Asia). The same is true for education levels; degree holders had both the largest increase in the immigrant population share and the low-income rate. These correlations make it difficult to separate the effect of rising shares from that of increasing rates within groups. Although we were unable to account for the effect of changing immigrant class in this analysis, it would tend to put downward pressure on the low-income rate, particularly in the late 1990s, as the share of recent immigrants in the economic class (who have superior labour market outcomes) rose.

The increase in recent immigrant low-income rates was widespread, occurring among immigrants from all age groups, whether the immigrants spoke an official language or not, in all family types (except single parents, who already had an extremely high rate), and all educational levels. Any search for explanations must take this into account. However, in spite of the concern regarding the rising demand for the highly educated, and the needs of the "knowledge based economy", having a degree, no matter what the discipline, did not protect these recent immigrants from a rising probability of being in low-income. The gap in low-income rates between the Canadian born and recent immigrants was highest among degree holders, particularly those with engineering and applied science degrees. Degree holders have lower low-income rates than their less educated colleagues, but relative to Canadian born, they are faring least well. The rise in

low-income was observed in six of the thirteen source regions. However, it was most pronounced among recent immigrants from Africa, the Asian regions and Southern Europe.

As immigrants acquire Canadian experience, their low-income rates do fall. There is some evidence that the more recent cohorts with the higher entry level low-income rates experienced a more rapid decline in low-income rates than did earlier cohorts, resulting in some "catch-up" with earlier cohorts in terms of family welfare outcomes. This "catch-up" was also widespread, occurring among recent immigrant cohorts from most source countries, with all levels of education, and both language groups. However, after a number of years in Canada, low-income rates remained higher among more recent entering cohorts than among those of the 1970s (comparing groups with the same number of years in Canada).

In the aggregate, low-income rates fell among the Canadian born, and rose among most immigrant groups over the past two decades. The rise in the low-income rate in the three major Canadian cities (and their associated provinces) between 1990 and 2000 was largely concentrated among the immigrant population. However, this refers to change over time. In terms of level, most of the low-income population are not immigrants; they constituted about 29% of the low-income population in Canada in 2000 (and 22% of the total population), up from 20% in 1980 (when they also represented 20% of the total population).

Why the peak to peak rise in low-income rates among immigrants, and recent immigrants in particular? The changing characteristics of entering immigrants may be part of the explanation, but this paper suggests that it did not play the dominant role. While the change in some characteristics tended to increase low-income rates, one would have expected others to tend to reduce it. Over this period education levels of entry level immigrants were rising, and through the 1990s immigrants were increasingly in the "economic" immigrant class, a group that traditionally has better labour market outcomes than others.

The major component of family income is of course earnings. Hence, explanations of the decline in entry level earnings will no doubt explain to a considerable extent the rise in low-income. Our current knowledge of these explanations was reviewed in the introduction. They relate to a host of possibilities, including:

- Economic conditions at time of entry. Immigrants entering in the early to mid 1990s in particular entered a labour market with virtually no full-time employment growth, and some growth in self-employment[17]. Employment opportunities were limited (Picot and Heisz, 2000). Immigrants in this position would not only have poor economic outcomes at time of entry, but may not "catch-up" to earlier cohorts, as their Canadian employment experience may be less than ideal, affecting future outcomes.

[17] The standard practice is to use an unemployment rate to control for labour market conditions. However, this may be underestimating the effect of changing labour market conditions. During the 1990s cycle, the shift in the type of employment (towards part-time and self-employment and away from full-time jobs) would not be picked up in the unemployment rate, but this almost certainly had a significant effect on earnings outcomes.

- Deteriorating outcomes for new labour market entrants in general through the 1980s and 1990s, which affected recent immigrants as well, since they are part of this pool of new labour market entrants (Green and Worswick, 2002).
- Declining returns to foreign work experience, both because of a shift to source countries where foreign work experience has traditionally been discounted, and a decline in returns to foreign experience among immigrants from particular source countries (Green and Worwick, 2002).
- A "credentialism" issue, as degrees and certification from the non-traditional source countries may be recognized to a lesser extent than among the Canadian-born and educated. However, this decreased level of economic return to foreign credentials does not seem to have increased through time, and hence, it is not clear to what extent it will account for declining earnings among recent immigrants (Ferrer and Riddell, 2003).
- A possible shift to source countries where the quality of education is lower than in the traditional source countries, and hence returns to education may be falling (Sweetman, 2003).
- A deterioration in the "networks" that are available to recent immigrants, particularly for the economic immigrant class, as they have fewer ties immediately upon arrival. This would presumably improve over time.
- Possible supply effects that may be affecting the more highly educated recent immigrants in particular. The domestic supply of highly educated workers in Canada has been rising at a rapid pace over the past two decades, particularly among women. The number of women in the labour force with a university degree more than quadrupled between 1980 and 2000, a dramatic change in the stock of the highly educated over a short time span. The number of comparable men more than doubled, so that overall the supply of the highly educated rose approximately 160%. Analysis has tended to focus on the rise in the demand for highly educated workers, due to technological change. But the supply has been increasing at a remarkable rate. Evidence in the form of changing relative earnings (Murphy, Riddell and Romer, 1998), and a recent study of potential shortages (Gingras and Roy, 2000) suggest that during the past two decades there was not a general shortage of the highly educated. There may have been shortages in specific occupations. Furthermore, median earnings of university graduates, particularly younger graduates, fell over the past two decades (2001 census results, Beaudry and Green, 2000; Finnie, 1999), a possible indication that there has not been a shift in the supply demand balance towards increasing relative demand. Highly educated immigrants entering a labour market with a rapidly increasing domestic supply may experience labour market difficulties. Little evidence exists regarding this issue, and it is not known how significant it is. More research focusing on this topic would be useful.

But low-income rates can be influenced by factors other than the determinants of median or mean earnings. Low-income analysis focuses on the bottom of the income distribution. It may be that earnings inequality and income inequality are changing among the immigrant population, resulting in an increasingly large group at the bottom of the earnings and family income distributions who are in low-income. The earnings and income gap between the entering immigrants who do well in the labour market, and those who do not, may be widening. Family formation patterns could be shifting among the immigrant population, as they have been among the Canadian population as a whole, tending to increase family earnings inequality. Finally, the

extent to which the social transfer benefits (EI, SA, child tax benefits, workers compensation, etc.) tend to offset the deterioration in earnings among recent immigrants may be changing.

All of these factors, and no doubt others, are possible determinants of the rise in the actual and relative low-income rates among "recent" immigrants in particular. An understanding of the role of some of these factors exists (as reviewed earlier), but for many the possibilities mentioned above are pure speculation. Future research will no doubt address these issues.

Table 1. Low income rates by immigration status, Canada, 1980-2000

	Low-income rate								Low-income rates relative to native born					
				Years of residence in Canada						Years of residence in Canada				
	Total population	Non-immigrants	All immigrants	<= 5	6 - 10	11-15	16-20	> 20	All immigrants	<= 5	6 - 10	11-15	16-20	> 20
SCF/SLID														
1981	0.155	0.155	0.154	0.202	0.159	0.115	0.123	0.165	1.0	1.3	1.0	0.7	0.8	1.1
1989	0.137	0.137	0.137	0.299	0.155	0.129	0.129	0.104	1.0	2.2	1.1	0.9	0.9	0.8
2000	0.147	0.132	0.185	0.434	0.278	0.226	0.181	0.114	1.4	3.3	2.1	1.7	1.4	0.9
	(0.004)	(0.003)	(0.011)	(0.041)	(0.035)	(0.027)	(0.026)	(0.013)						
Census														
1980	0.171	0.172	0.170	0.246	0.187	0.144	0.147	0.167	1.0	1.4	1.1	0.8	0.9	1.0
1985	0.187	0.185	0.193	0.342	0.260	0.198	0.159	0.165	1.0	1.8	1.4	1.1	0.9	0.9
1990	0.155	0.151	0.171	0.313	0.242	0.190	0.152	0.126	1.1	2.1	1.6	1.3	1.0	0.8
1995	0.191	0.176	0.247	0.470	0.353	0.272	0.221	0.155	1.4	2.7	2.0	1.6	1.3	0.9
2000	0.156	0.143	0.202	0.358	0.283	0.227	0.191	0.133	1.4	2.5	2.0	1.6	1.3	0.9

Data sources: the 1981 to 2001 Census 20% sample micro data; 1981 and 1989 Survey of Consumer Finances (SCF); 2001 Survey of Labour and Income Dynamics (SLID).

Note: numbers in the brackets are standard errors of low-income rates. The standard errors for SLID are calculated using 500 replicate bootstrap weights to take into account sample design effects. The corresponding standard errors assuming simple random sampling are .001 (total population), .001 (non-immigrants), .003 (all immigrants), .013(<=5), .010 (6-10), .009 (11-15), .009 (16-20), .004 (>20). The largest standard error for census low-income rates is .0018 for 0-5 year immigrant group in the 1986 census. The standard errors for SCF are not calculated since bootstrap weights were not available, but are likely to be similar to those for SCF data.

Table 2. Changes in low income rates and population composition among recent immigrants (living in Canada <=5 years), Canada

	Low-income rate (%)			Population characteristics		
	1980	1990	2000	1981	1991	2001
All recent immigrants	24.6	31.3	35.8	100%	100%	100%
By source region						
North America	18.4	19.7	15.1	7%	3%	2%
Caribbean	38.3	40.0	37.5	8%	7%	4%
South & Central America	30.6	40.6	29.9	8%	11%	5%
Northern Europe	11.0	13.8	12.5	14%	5%	2%
Western Europe	23.9	17.9	18.4	5%	3%	3%
Southern Europe	21.5	21.6	34.7	10%	6%	5%
Eastern Europe	22.3	31.8	27.4	4%	10%	10%
Africa	20.7	34.9	45.8	6%	7%	9%
South Asia	17.4	23.9	31.8	8%	10%	19%
Southeast Asia	35.3	33.8	23.0	13%	13%	8%
East Asia	26.8	28.0	45.1	11%	17%	24%
Western Asia	34.0	48.0	51.7	5%	8%	9%
Oceania & other	17.7	25.2	16.5	2%	1%	1%
By educational level (all immigrants)[1]						
Less than high school	33.3	38.5	42.2	34%	30%	18%
High school graduation	26.6	34.3	42.0	11%	14%	11%
Some post secondary	20.4	30.0	37.5	39%	37%	33%
With university degrees	15.5	21.0	29.6	17%	20%	38%
By educational level (age 25-65)						
Less than high school	28.8	34.3	38.4	31%	27%	16%
High school graduation	21.9	31.0	38.8	10%	14%	10%
Some post secondary	17.4	26.4	33.7	39%	38%	32%
With university degrees	14.5	19.1	27.5	19%	22%	42%
By home language						
Non official language	28.6	34.4	38.9	46%	57%	63%
English/French	21.2	27.3	30.7	54%	43%	37%
By age group						
<10	28.9	37.8	40.4	19%	19%	17%
10 -19	27.2	37.1	44.1	13%	14%	15%
20-29	24.2	30.1	33.1	27%	21%	16%
30-39	18.9	27.2	30.9	20%	24%	25%
40-49	20.4	28.1	36.4	7%	11%	16%
50-59	23.7	27.3	33.9	5%	5%	6%
>= 60	30.6	28.8	28.5	8%	6%	5%
By family structure						
Unattached individuals	46.8	50.5	49.5	8%	8%	7%
Two-adults, no kids	18.8	22.5	26.8	21%	22%	21%
One adult, with kids	73.0	80.0	73.5	2%	4%	4%
Two-adults, with kids	22.5	28.9	35.0	70%	66%	68%

Data sources: the 1981 to 2001 Census 20% sample micro data

Note 1: for children younger than 18 and living with their parents, their education level was assigned as that of the highest earner in the family

Table 3. Associations between changes in socio-demographic composition[a] and rising low-income levels among recent immigrants (living in Canada 5 years or less)

	Low-income rate		Due to changes in ...[b]			
	Time 1	Time 2	Total changes in low-income rates	Composition	Regression coefficient	Interaction b/w coefficient and composition
1980-1990	24.6%	31.3%	100	35%	40%	26%
Due to						
Source region				22%		
Home language				9%		
Education				-6%		
Family structure				13%		
Age structure				-3%		
1990-2000	31.3%	35.8%	100	-64%	81%	83%
Due to						
Source region				-8%		
Home language				9%		
Education				-59%		
Family structure				-6%		
Age structure				0%		
1980-2000	24.6%	35.8%	100	-12%	48%	64%
Due to						
Source region				8%		
Home language				12%		
Education				-33%		
Family structure				7%		
Age structure				-6%		

Data sources: the 1981, 1991 and 2001 Census 20% sample micro data

Notes:

a. Variables in the multivariate models included source regions, education, language, age, family structure. See Table 2 for details.

b. based on The Even-MacPherson decomposition method.

Table 4. "Predicted" Changes in low-income rates holding the mix of recent immigrants fixed*

	"Predicted" low-income		% Change
	1980	2000	
All recent immigrants	23.8%	36.3%	53%
By source region			
North America	23.5%	20.6%	-12%
Caribbean	35.8%	34.1%	-5%
South & Central America	28.1%	28.4%	1%
Northern Europe	13.9%	17.3%	24%
Western Europe	25.1%	21.0%	-16%
Southern Europe	15.6%	33.4%	115%
Eastern Europe	21.1%	28.3%	34%
Africa	23.0%	44.6%	94%
South Asia	17.9%	33.4%	86%
Southeast Asia	32.4%	24.3%	-25%
East Asia	23.9%	45.4%	90%
Western Asia	31.2%	51.1%	64%
Oceania & other	18.3%	19.5%	6%
By education level			
Less than high school	33.1%	41.2%	24%
High school graduation	27.1%	40.6%	50%
Some post secondary	22.0%	37.9%	72%
With university degrees	17.3%	28.8%	66%
By home language			
Non official language	26.4%	39.1%	48%
English/French	20.3%	32.6%	61%
By age group			
<10	31.0%	41.6%	34%
10 -19	25.4%	42.3%	67%
20-29	22.4%	33.2%	48%
30-39	20.3%	32.1%	59%
40-49	20.7%	36.8%	78%
50-59	20.6%	34.7%	68%
>= 60	25.7%	27.0%	5%
By family type			
Unattached individuals	48.1%	55.6%	16%
Two-adults, no kids	19.1%	29.9%	56%
One adult, with kids	68.0%	71.1%	4%
Two-adults, with kids	20.5%	34.6%	69%

Data sources: the 1981 and 2001 Census 20% sample micro data.
*At the values observed in the pooled 1980-2000 data

Table 5. Low income rates of people who were aged 25 or over and spoke an official language at home by educational level and immigrant status, Canada, 1980 to 2000

	Low-income rate (%)										Low-income rate relative to compatible non-immigrants				
	Recent arrivals					Non-immigrants									
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
Men															
25-40															
Less than high school	26.3	36.2	34.2	43.8	33.2	17.8	21.8	18.8	25.2	21.4	1.5	1.7	1.8	1.7	1.5
High school graduation	18.8	31.7	29.0	42.6	26.4	9.7	11.8	9.5	13.6	11.8	1.9	2.7	3.1	3.1	2.2
Some post secondary	13.6	24.8	22.8	34.7	26.8	9.1	11.6	8.9	12.6	9.6	1.5	2.1	2.6	2.8	2.8
With university degrees	12.0	18.1	14.6	28.2	21.3	6.2	7.3	6.0	7.7	5.8	1.9	2.5	2.4	3.7	3.7
41-55															
Less than high school	21.5	30.4	26.7	46.1	30.0	14.9	17.9	16.0	20.3	18.7	1.4	1.7	1.7	2.3	1.6
High school graduation	13.5	28.0	27.5	42.3	29.5	7.3	9.1	7.3	10.5	9.1	1.8	3.1	3.8	4.0	3.3
Some post secondary	11.8	18.6	19.2	34.1	24.9	6.9	8.8	7.0	10.1	8.2	1.7	2.1	2.7	3.4	3.0
With university degrees	9.0	17.3	17.7	32.1	25.4	3.3	3.8	3.3	4.5	4.0	2.7	4.5	5.4	7.1	6.4
over 55															
Less than high school	32.2	37.6	28.9	34.8	25.5	22.1	21.0	17.9	17.6	15.7	1.5	1.8	1.6	2.0	1.6
High school graduation	22.5	33.0	17.0	29.6	20.4	11.4	10.9	9.7	10.8	10.0	2.0	3.0	1.8	2.7	2.0
Some post secondary	20.8	28.6	24.3	24.9	22.4	10.6	10.4	8.7	9.8	8.8	2.0	2.8	2.8	2.6	2.5
With university degrees	21.4	19.0	15.6	26.0	19.6	4.9	4.6	3.5	4.2	4.2	4.4	4.1	4.5	6.3	4.7
total 25 and over															
Less than high school	27.0	35.6	31.6	42.4	30.8	18.6	20.4	17.7	20.5	18.0	1.5	1.7	1.8	2.1	1.7
High school graduation	18.4	31.4	27.4	41.3	26.5	9.5	11.0	8.9	12.1	10.3	1.9	2.9	3.1	3.4	2.6
Some post secondary	13.8	24.1	22.2	34.1	26.0	8.8	10.7	8.4	11.3	8.9	1.6	2.2	2.7	3.0	2.9
With university degrees	12.0	18.0	15.4	29.1	22.5	5.4	6.0	4.7	6.0	4.8	2.2	3.0	3.3	4.9	4.7
Women															
25-40															
Less than high school	26.9	40.0	39.3	53.5	35.9	23.5	28.1	26.6	34.1	30.7	1.1	1.4	1.5	1.6	1.2
High school graduation	18.9	27.9	25.4	43.0	33.4	12.1	13.9	11.9	16.7	15.7	1.6	2.0	2.1	2.6	2.1
Some post secondary	16.5	24.5	22.8	36.6	28.2	11.2	13.6	11.9	15.7	13.1	1.5	1.8	1.9	2.3	2.2
With university degrees	12.1	16.5	13.1	23.9	19.0	7.3	7.8	6.4	8.0	5.9	1.6	2.1	2.0	3.0	3.2
41-55															
Less than high school	26.1	33.9	29.2	44.1	31.5	18.0	21.0	19.4	24.1	22.2	1.4	1.6	1.5	1.8	1.4
High school graduation	19.6	23.2	24.9	37.5	27.6	9.1	10.3	8.0	11.0	9.7	2.1	2.2	3.1	3.4	2.9
Some post secondary	13.5	22.6	21.0	36.3	26.8	8.2	9.5	8.4	10.9	9.7	1.6	2.4	2.5	3.3	2.8
With university degrees	13.0	19.8	19.3	32.1	22.9	4.4	5.1	4.1	5.2	4.4	2.9	3.9	4.7	6.2	5.1
Over 55															
Less than high school	38.3	36.6	32.7	34.7	28.2	32.4	31.0	27.0	27.1	25.6	1.2	1.2	1.2	1.3	1.1
High school graduation	22.7	40.2	25.3	27.0	21.7	20.3	19.0	14.8	15.8	15.0	1.1	2.1	1.7	1.7	1.4
Some post secondary	29.8	29.6	26.5	30.1	23.1	16.4	15.6	13.2	13.7	13.0	1.8	1.9	2.0	2.2	1.8
With university degrees	17.9	27.6	18.2	20.7	18.5	8.0	7.6	6.8	6.8	7.0	2.2	3.6	2.7	3.0	2.6
total 25 and over															
Less than high school	30.5	37.7	35.2	46.2	32.7	25.5	27.5	25.0	27.9	25.6	1.2	1.4	1.4	1.7	1.3
High school graduation	19.5	29.0	25.3	40.2	30.6	12.9	14.1	11.5	14.5	13.0	1.5	2.1	2.2	2.8	2.4
Some post secondary	16.9	24.7	22.7	36.2	27.6	11.5	13.0	11.2	13.9	11.9	1.5	1.9	2.0	2.6	2.3
With university degrees	12.4	17.4	14.4	25.6	19.9	6.9	7.3	5.9	7.0	5.6	1.8	2.4	2.5	3.7	3.6

Data sources: the 1981 to 2001 Census 20% sample micro data.

Table 6. Low income rates of people who were aged 25 or over by educational level and immigrant status, Canada, 1980 to 2000

	Low-income rate (%)										Low-income rate relative to compatible non-immigrants				
	Recent arrivals					Non-immigrants									
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
Men															
25-40															
Less than high school	29.2	38.8	34.3	48.6	35.5	17.8	21.8	18.8	25.2	21.4	1.6	1.8	1.8	1.9	1.7
High school graduation	22.2	35.7	32.4	46.1	36.2	9.7	11.8	9.5	13.6	11.8	2.3	3.0	3.4	3.4	3.1
Some post secondary	16.2	29.1	27.0	40.7	31.2	9.1	11.6	8.9	12.6	9.6	1.8	2.5	3.0	3.2	3.3
With university degrees	14.1	21.7	17.5	33.7	25.4	6.2	7.3	6.0	7.7	5.8	2.3	3.0	2.9	4.4	4.4
41-55															
Less than high school	26.6	38.7	31.7	51.4	41.1	14.9	17.9	16.0	20.3	18.7	1.8	2.2	2.0	2.5	2.2
High school graduation	18.9	35.2	31.5	51.0	42.4	7.3	9.1	7.3	10.5	9.1	2.6	3.9	4.3	4.9	4.7
Some post secondary	16.3	24.7	25.8	45.4	35.8	6.9	8.8	7.0	10.1	8.2	2.4	2.8	3.7	4.5	4.3
With university degrees	14.3	22.8	24.7	41.4	33.8	3.3	3.8	3.3	4.5	4.0	4.3	6.0	7.6	9.2	8.5
over 55															
Less than high school	30.0	36.6	29.3	42.5	29.0	22.1	21.0	17.9	17.6	15.7	1.4	1.7	1.6	2.4	1.8
High school graduation	21.8	30.6	25.2	40.8	27.7	11.4	10.9	9.7	10.8	10.0	1.9	2.8	2.6	3.8	2.8
Some post secondary	24.4	31.4	28.8	38.6	30.0	10.6	10.4	8.7	9.8	8.8	2.3	3.0	3.3	3.9	3.4
With university degrees	25.4	28.6	23.8	37.7	30.3	4.9	4.6	3.5	4.2	4.2	5.2	6.2	6.8	9.1	7.3
total 25 and over															
Less than high school	28.9	38.1	32.6	47.4	35.4	18.6	20.4	17.7	20.5	18.0	1.6	1.9	1.8	2.3	2.0
High school graduation	21.5	34.7	31.4	46.7	37.2	9.5	11.0	8.9	12.1	10.3	2.3	3.2	3.5	3.9	3.6
Some post secondary	16.8	28.5	26.8	41.7	32.6	8.8	10.7	8.4	11.3	8.9	1.9	2.7	3.2	3.7	3.6
With university degrees	14.9	22.5	19.9	36.2	28.4	5.4	6.0	4.7	6.0	4.8	2.8	3.7	4.2	6.1	5.9
Women															
25-40															
Less than high school	28.9	42.6	39.2	54.5	42.5	23.5	28.1	26.6	34.1	30.7	1.2	1.5	1.5	1.6	1.4
High school graduation	22.8	31.1	30.4	49.4	39.3	12.1	13.9	11.9	16.7	15.7	1.9	2.2	2.5	3.0	2.5
Some post secondary	18.2	26.6	26.5	42.4	33.8	11.2	13.6	11.9	15.7	13.1	1.6	2.0	2.2	2.7	2.6
With university degrees	13.8	19.7	16.8	30.9	25.0	7.3	7.8	6.4	8.0	5.9	1.9	2.5	2.6	3.9	4.2
41-55															
Less than high school	27.8	36.2	32.2	48.7	40.5	18.0	21.0	19.4	24.1	22.2	1.5	1.7	1.7	2.0	1.8
High school graduation	21.0	31.4	31.5	49.1	41.8	9.1	10.3	8.0	11.0	9.7	2.3	3.0	3.9	4.5	4.3
Some post secondary	17.8	28.6	24.9	43.8	36.4	8.2	9.5	8.4	10.9	9.7	2.2	3.0	3.0	4.0	3.7
With university degrees	15.5	23.1	24.0	38.8	30.8	4.4	5.1	4.1	5.2	4.4	3.5	4.5	5.8	7.5	6.9
Over 55															
Less than high school	31.9	35.0	28.8	39.6	29.1	32.4	31.0	27.0	27.1	25.6	1.0	1.1	1.1	1.5	1.1
High school graduation	23.6	35.2	27.8	37.2	28.9	20.3	19.0	14.8	15.8	15.0	1.2	1.9	1.9	2.4	1.9
Some post secondary	28.2	32.8	29.1	38.9	30.6	16.4	15.6	13.2	13.7	13.0	1.7	2.1	2.2	2.8	2.4
With university degrees	28.4	31.5	22.6	36.4	24.3	8.0	7.6	6.8	6.8	7.0	3.5	4.1	3.3	5.3	3.5
total 25 and over															
Less than high school	29.8	38.3	34.2	47.6	37.5	25.5	27.5	25.0	27.9	25.6	1.2	1.4	1.4	1.7	1.5
High school graduation	22.7	31.8	30.4	47.8	38.9	12.9	14.1	11.5	14.5	13.0	1.8	2.3	2.6	3.3	3.0
Some post secondary	18.9	27.4	26.3	42.5	34.3	11.5	13.0	11.2	13.9	11.9	1.6	2.1	2.3	3.1	2.9
With university degrees	14.6	20.7	18.4	32.9	26.4	6.9	7.3	5.9	7.0	5.6	2.1	2.8	3.1	4.7	4.8

Data sources: the 1981 to 2001 Census 20% sample micro data.

Table 7. Low-income rate of university-educated men who were aged 24-44 by immigrant status and major filed of study, 1990 and 2000

	Low-income rate			Relative to non-immigrants	
	Non-immigrants	All recent immigrants	Recent immigrants who spoke English/French at home	All recent immigrants	Recent immigrants who spoke English/French at home
1990					
Engineering, applied science technologies	3.2	14.7	13.1	4.6	4.1
Mathematics and physical sciences	4.2	17.4	14.8	4.2	3.5
Health, Agricultural and biological sciences	5.4	16.9	11.0	3.1	2.1
Teaching, Social sciences, Commerce	4.9	18.2	15.1	3.7	3.1
Fine arts, Humanities	12.0	24.0	19.5	2.0	1.6
2000					
Engineering, applied science technologies	3.5	24.2	19.4	7.0	5.6
Mathematics and physical sciences	4.4	20.9	19.0	4.8	4.3
Health, Agricultural and biological sciences	5.7	30.0	24.1	5.2	4.2
Teaching, Social sciences, Commerce	4.8	27.7	21.5	5.8	4.5
Fine arts, Humanities	11.2	29.8	23.5	2.6	2.1

Data sources: the 2001 Census 20% sample micro data.

Table 8. Changes in low-income rate and population composition by immigrant status

	Subgroups of non-immigrants					Immigrants by years since immigration				
	Non-immigrants	Single-parent families	Other young families	Seniors	Others	Immigrants	<= 5	6 - 10	11-15	16-20	> 20
	Percentage point changes in low-income rate										
1980-1990	-2.0%	-6.5%	-0.4%	-9.0%	-2.6%	0.1%	6.8%	5.5%	4.6%	0.5%	-4.1%
1990-2000	-0.9%	-9.4%	0.7%	-3.5%	-0.7%	3.1%	4.5%	4.2%	3.6%	3.9%	0.6%
1980-2000	-2.9%	-16.0%	0.3%	-12.5%	-3.3%	3.1%	11.3%	9.7%	8.2%	4.4%	-3.4%
	Percent share in total population										
1980	80.0%	3.2%	20.6%	5.8%	50.3%	20.0%	1.6%	3.1%	3.6%	2.0%	9.7%
1990	80.3%	4.1%	19.4%	7.5%	49.3%	19.7%	2.2%	1.9%	2.4%	3.2%	9.9%
2000	78.0%	4.5%	12.7%	8.3%	52.6%	22.0%	2.5%	3.6%	3.0%	1.9%	10.9%
	Percent share in low-income population										
1980	80.1%	12.0%	15.0%	9.6%	43.5%	19.9%	2.3%	3.4%	3.0%	1.7%	9.5%
1990	78.4%	15.2%	15.0%	9.4%	38.8%	21.6%	4.5%	3.0%	2.9%	3.1%	8.1%
2000	71.5%	13.7%	10.3%	8.5%	38.9%	28.5%	5.9%	6.6%	4.4%	2.3%	9.3%

Data sources: the 1981 to 2001 Census 20% sample micro data.

Table 9. Contribution to the changes in the aggregate Canadian low-income rates

	1980-1990	1990- 2000	1980 - 2000
Total percentage point changes in low-income rate	-1.6%	0.05%	-1.6%
Contributions to the total changes			
Non-immigrants	-1.6%	-1.0%	-2.6%
Single-parent families	0.3%	-0.2%	0.1%
Other young families	-0.2%	-0.7%	-1.0%
Seniors	-0.2%	-0.1%	-0.3%
Others	-1.4%	0.0%	-1.4%
Immigrants	-0.1%	1.1%	1.0%
<= 5 years	0.3%	0.2%	0.5%
6 - 10 years	-0.1%	0.6%	0.4%
11- 15 years	-0.1%	0.2%	0.2%
16- 20 years	0.2%	-0.1%	0.1%
Over 20 years	-0.4%	0.2%	-0.2%
Due to changes in group-specific rates			
Non-immigrants	-1.6%	-0.7%	-2.3%
Immigrants	0.0%	0.6%	0.6%
Due to changes in group share			
Non-immigrants	0.1%	-0.4%	-0.3%
Immigrants	-0.1%	0.4%	0.3%
Due to changes in both rate and share			
Non-immigrants	0.0%	0.0%	0.1%
Immigrants	0.0%	0.1%	0.1%

Data sources: the 1981 to 2001 Census 20% sample micro files.

Table 10. Contribution to the changes in the aggregate low-income rates, provinces and the three largest Census Metropolitan Areas

Atlantic region								
		1980-1990		1990- 2000		1980 - 2000		
Total percentage point changes in low-income rate		-3.5%		0.2%		-3.4%		
Contributions to the total changes								
Non-immigrants		-3.3%		0.1%		-3.2%		
Immigrants		-0.2%		0.1%		-0.2%		
	<= 5 years		0.0%		0.0%		0.0%	
	6 - 10 years		-0.1%		0.0%		0.0%	
	11- 20 years		0.0%		-0.1%		-0.1%	
	Over 20 years		-0.2%		0.1%		-0.1%	
Due to changes in ...								
group-specific rates	Non-immigrants	-3.4%		0.1%		-3.3%		
	Immigrants	-0.2%		0.1%		-0.1%		
group share	Non-immigrants	0.1%		0.0%		0.1%		
	Immigrants	-0.1%		0.0%		-0.1%		
both rate and share	Non-immigrants	0.0%		0.0%		0.0%		
	Immigrants	0.0%		0.0%		0.0%		

Quebec		1980-1990		1990- 2000		1980 - 2000		
Total percentage point changes in low-income rate		-1.4%		-0.2%		-1.6%		
Contributions to the total changes								
Non-immigrants		-1.8%		-1.0%		-2.8%		
Immigrants		0.4%		0.8%		1.2%		
	<= 5 years		0.2%		0.1%		0.3%	
	6 - 10 years		0.0%		0.3%		0.3%	
	11- 20 years		0.2%		0.1%		0.3%	
	Over 20 years		0.0%		0.3%		0.2%	
Due to changes in ...								
group-specific rates	Non-immigrants	-1.8%		-0.8%		-2.6%		
	Immigrants	0.3%		0.4%		0.7%		
group share	Non-immigrants	0.0%		-0.3%		-0.3%		
	Immigrants	0.0%		0.4%		0.4%		
both rate and share	Non-immigrants	0.0%		0.0%		0.0%		
	Immigrants	0.0%		0.1%		0.1%		

Ontario		1980-1990		1990- 2000		1980 - 2000		
Total percentage point changes in low-income rate		-2.6%		1.1%		-1.6%		
Contributions to the total changes								
Non-immigrants		-2.1%		-0.5%		-2.6%		
Immigrants		-0.5%		1.6%		1.1%		
	<= 5 years		0.4%		0.3%		0.7%	
	6 - 10 years		-0.3%		0.8%		0.5%	
	11- 20 years		-0.1%		0.2%		0.1%	
	Over 20 years		-0.5%		0.3%		-0.3%	
Due to changes in ...								
group-specific rates	Non-immigrants	-2.2%		-0.2%		-2.4%		
	Immigrants	-0.4%		1.1%		0.7%		
group share	Non-immigrants	0.2%		-0.3%		-0.3%		
	Immigrants	-0.2%		0.4%		0.3%		
both rate and share	Non-immigrants	0.0%		0.0%		0.1%		
	Immigrants	0.0%		0.1%		0.0%		

Table 10. Contribution to the changes in the aggregate low-income rates, provinces and the three largest Census Metropolitan Areas (continued)

Manitoba and Saskatchewan		1980-1990		1990- 2000		1980 - 2000	
Total percentage point changes in low-income rate		-0.6%		-2.1%		-2.8%	
Contributions to the total changes							
Non-immigrants		0.0%		-1.6%		-1.6%	
Immigrants		-0.6%		-0.5%		-1.1%	
	<= 5 years		0.1%		-0.1%		0.0%
	6 - 10 years		0.1%		0.0%		0.0%
	11- 20 years		0.2%		-0.2%		0.0%
	Over 20 years		-1.0%		-0.2%		-1.2%
Due to changes in ...							
group-specific rates	Non-immigrants	-0.4%		-1.8%		-2.1%	
	Immigrants	-0.2%		-0.3%		-0.6%	
group share	Non-immigrants	0.4%		0.2%		0.5%	
	Immigrants	-0.4%		-0.2%		-0.6%	
both rate and share	Non-immigrants	0.0%		0.0%		-0.1%	
	Immigrants	0.0%		0.0%		0.1%	

Alberta		1980-1990		1990- 2000		1980 - 2000	
Total percentage point changes in low-income rate		1.9%		-3.4%		-1.5%	
Contributions to the total changes							
Non-immigrants		1.1%		-2.5%		-1.4%	
Immigrants		0.8%		-0.8%		-0.1%	
	<= 5 years		0.3%		-0.2%		0.1%
	6 - 10 years		0.2%		0.0%		0.2%
	11- 20 years		0.7%		-0.4%		0.3%
	Over 20 years		-0.4%		-0.2%		-0.6%
Due to changes in ...							
group-specific rates	Non-immigrants	0.9%		-2.6%		-1.7%	
	Immigrants	1.0%		-0.7%		0.2%	
group share	Non-immigrants	0.2%		0.1%		0.3%	
	Immigrants	-0.2%		-0.1%		-0.3%	
both rate and share	Non-immigrants	-0.1%		0.0%		0.0%	
	Immigrants	-0.1%		0.0%		0.0%	

British Columbia		1980-1990		1990- 2000		1980 - 2000	
Total percentage point changes in low-income rate		0.2%		2.0%		2.2%	
Contributions to the total changes							
Non-immigrants		0.3%		-0.4%		-0.1%	
Immigrants		-0.1%		2.4%		2.3%	
	<= 5 years		0.4%		0.9%		1.2%
	6 - 10 years		-0.1%		1.1%		1.0%
	11- 20 years		0.3%		0.2%		0.5%
	Over 20 years		-0.7%		0.2%		-0.4%
Due to changes in ...							
group-specific rates	Non-immigrants	0.1%		0.2%		0.3%	
	Immigrants	0.1%		1.6%		1.8%	
group share	Non-immigrants	0.2%		-0.5%		-0.3%	
	Immigrants	-0.2%		0.6%		0.4%	
both rate and share	Non-immigrants	0.0%		0.0%		0.0%	
	Immigrants	0.0%		0.2%		0.2%	

Table 10. Contribution to the changes in the aggregate low-income rates, provinces and the three largest Census Metropolitan Areas (continued)

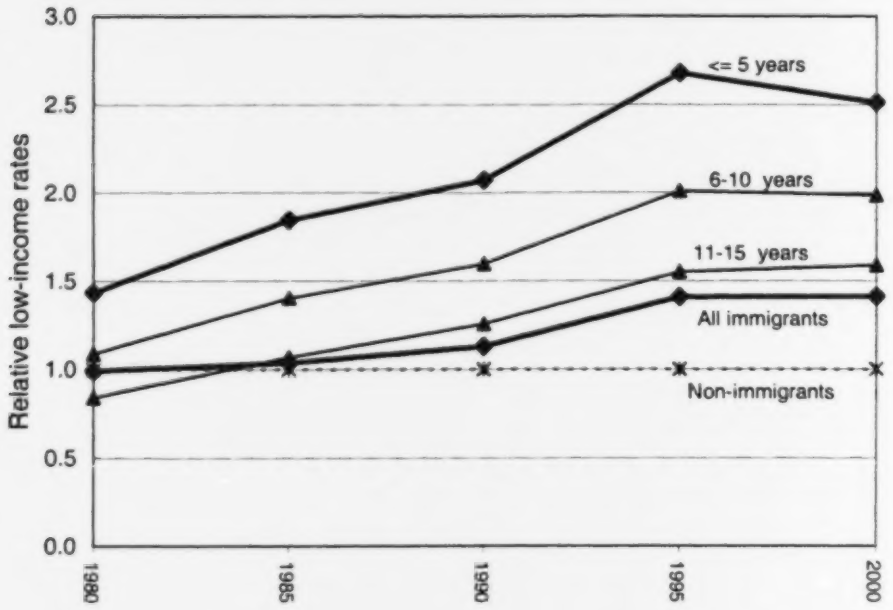
Montreal								
		1980-1990		1990- 2000		1980 - 2000		
Total percentage point changes in low-income rate		-0.6%		0.3%		-0.3%		
Contributions to the total changes								
Non-immigrants		-1.4%		-1.1%		-2.4%		
Immigrants		0.8%		1.4%		2.1%		
	<= 5 years		0.5%		0.0%		0.6%	
	6 - 10 years		-0.1%		0.7%		0.6%	
	11- 20 years		0.3%		0.2%		0.6%	
	Over 20 years		0.0%		0.4%		0.4%	
Due to changes in ...								
group-specific rates	Non-immigrants	-1.4%		-0.7%		-2.1%		
	Immigrants	0.6%		1.1%		1.6%		
group share	Non-immigrants	0.0%		-0.4%		-0.4%		
	Immigrants	0.2%		0.3%		0.4%		
both rate and share	Non-immigrants	0.0%		0.0%		0.0%		
	Immigrants	0.1%		0.0%		0.1%		

Toronto								
		1980-1990		1990- 2000		1980 - 2000		
Total percentage point changes in low-income rate		-2.3%		1.9%		-0.4%		
Contributions to the total changes								
Non-immigrants		-1.7%		-0.9%		-2.6%		
Immigrants		-0.6%		2.8%		2.2%		
	<= 5 years		0.8%		0.5%		1.3%	
	6 - 10 years		-0.8%		1.6%		0.7%	
	11- 20 years		-0.1%		0.2%		0.1%	
	Over 20 years		-0.5%		0.5%		0.1%	
Due to changes in ...								
group-specific rates	Non-immigrants	-1.8%		-0.4%		-2.1%		
	Immigrants	-0.5%		1.8%		1.3%		
group share	Non-immigrants	0.1%		-0.6%		-0.7%		
	Immigrants	-0.1%		0.8%		0.8%		
both rate and share	Non-immigrants	0.0%		0.0%		0.2%		
	Immigrants	0.1%		0.2%		0.1%		

Vancouver								
		1980-1990		1990- 2000		1980 - 2000		
Total percentage point changes in low-income rate		0.2%		3.1%		3.3%		
Contributions to the total changes								
Non-immigrants		-0.2%		-1.7%		-1.9%		
Immigrants		0.4%		4.7%		5.1%		
	<= 5 years		0.7%		1.7%		2.4%	
	6 - 10 years		-0.1%		2.2%		2.1%	
	11- 20 years		0.6%		0.5%		1.1%	
	Over 20 years		-0.9%		0.4%		-0.4%	
Due to changes in ...								
group-specific rates	Non-immigrants	-0.2%		-0.5%		-0.6%		
	Immigrants	0.4%		2.7%		3.0%		
group share	Non-immigrants	0.0%		-1.3%		-1.3%		
	Immigrants	0.0%		1.5%		1.4%		
both rate and share	Non-immigrants	0.0%		0.1%		0.1%		
	Immigrants	0.1%		0.6%		0.7%		

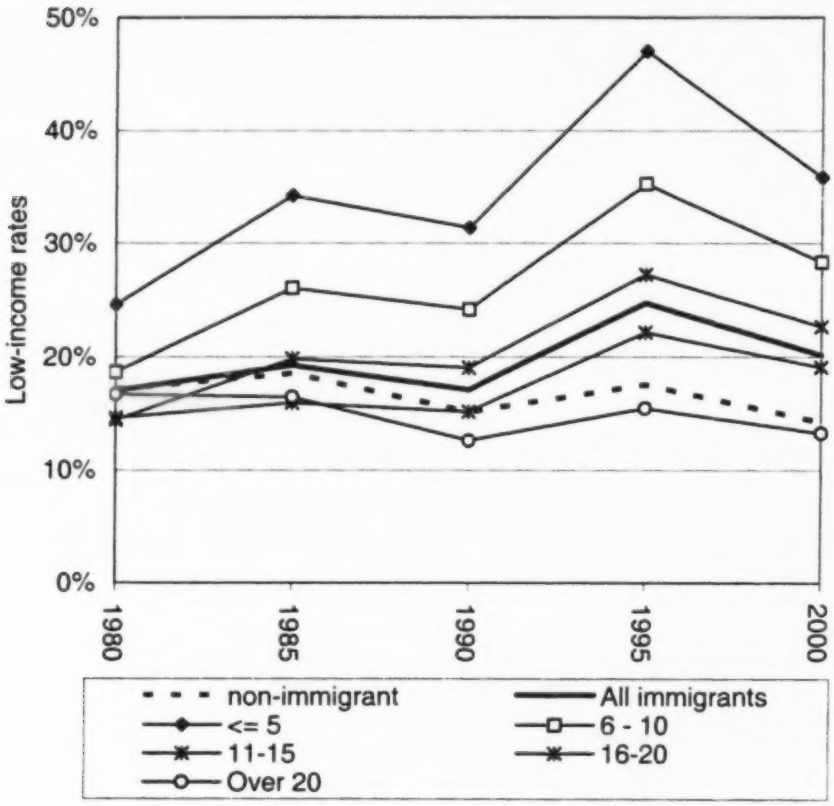
Data sources: the 1981 to 2001 Census 20% sample micro data.

Figure 1. Low-income rates of immigrants relative to non-immigrants, by 5-year period of immigration, 1980-2000, Canada



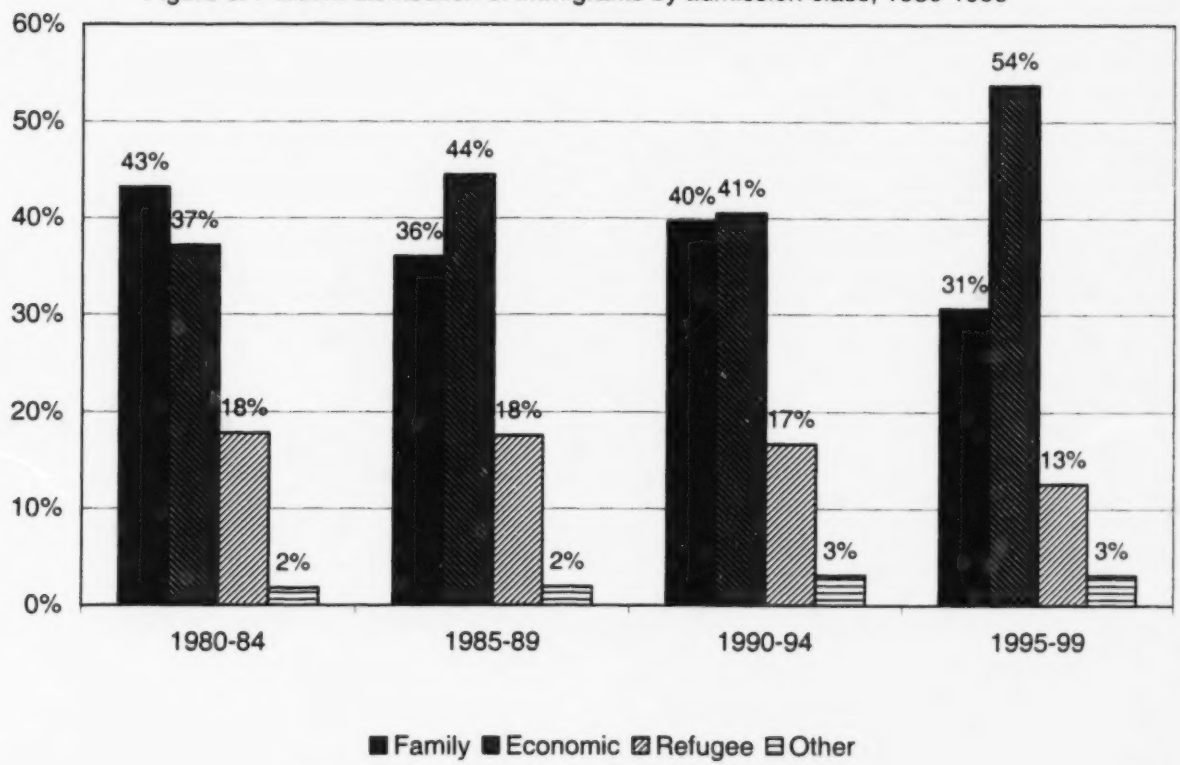
Data sources: the 1981- 2001 Census 20% sample micro data.

Figure 2. Low-income rates by immigration status, 1980-2000, Canada



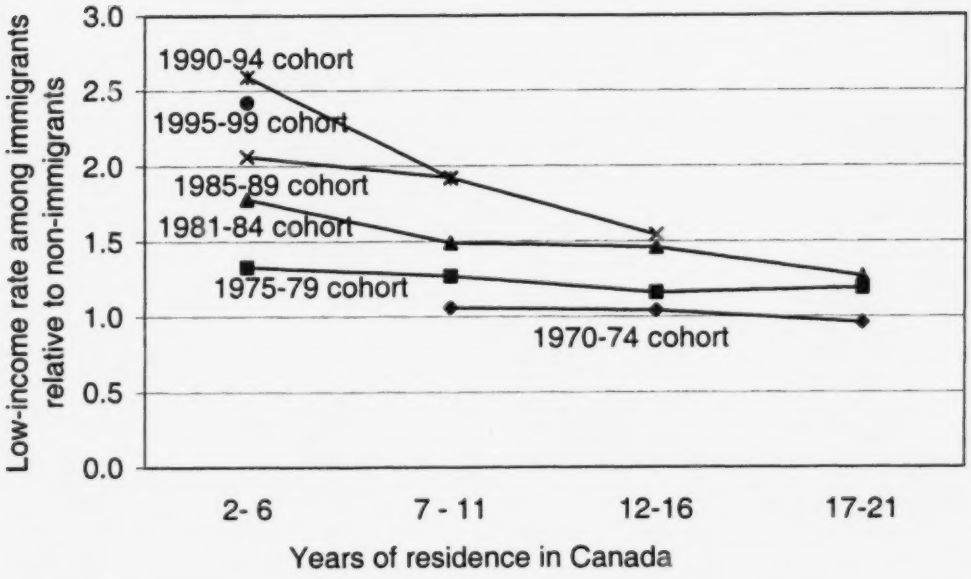
Data sources: the 1981- 2001 Census 20% sample micro data.

Figure 3. Percent distribution of immigrants by admission class, 1980-1999



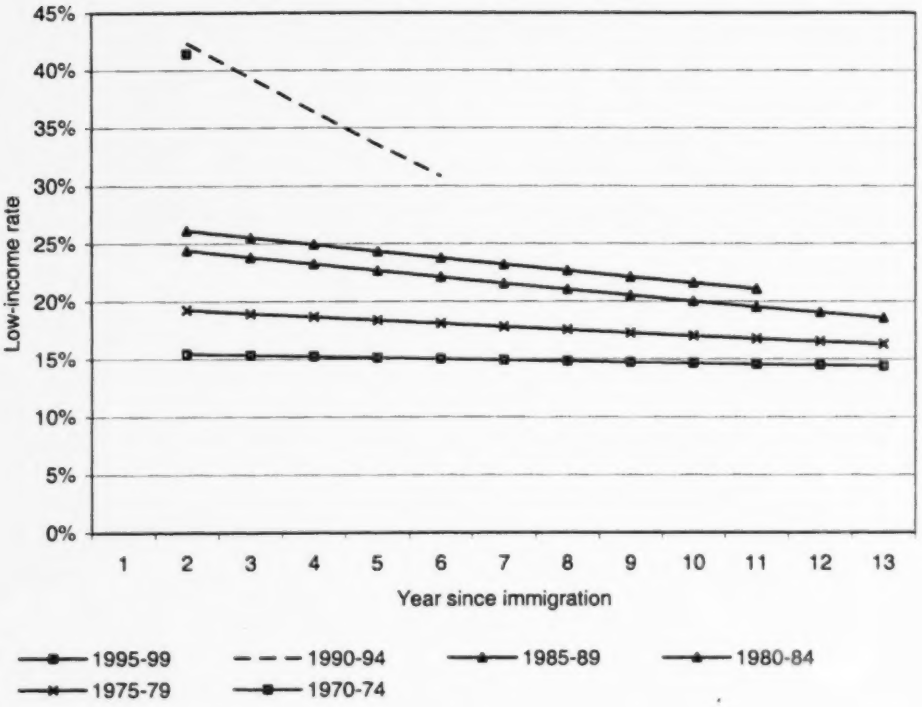
Data sources: Special tabulations produced by Citizenship and Immigration Canada from immigrant landing records.

Figure 4. Relative low-income rates of immigrants, various cohorts, by years of residence in Canada



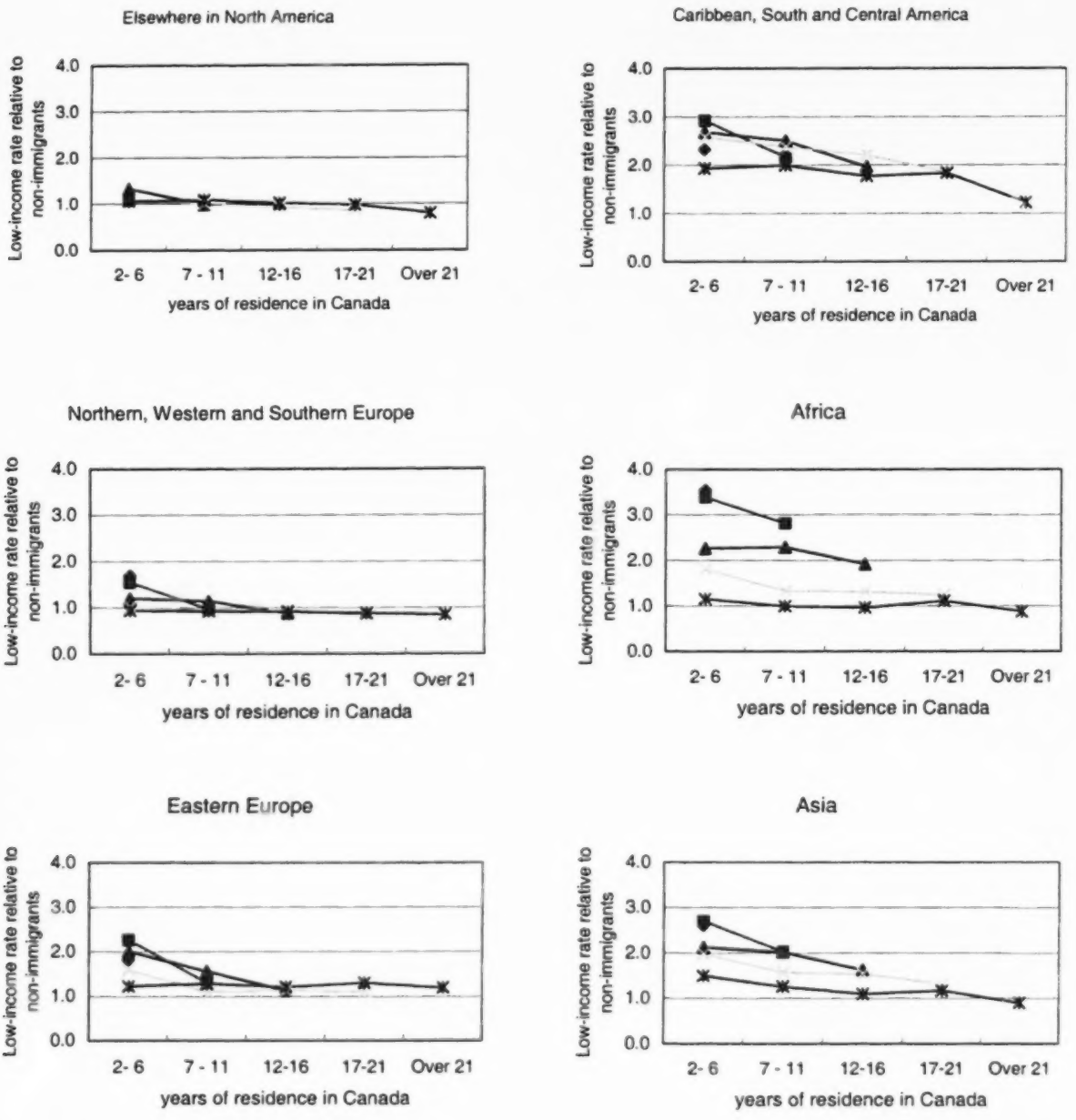
Data sources: the 1981 to 2001 Census 20% sample micro data.

Figure 4a. Predicted low-income rates of immigrants, various cohorts



Data sources: the 1981 to 2001 Census.

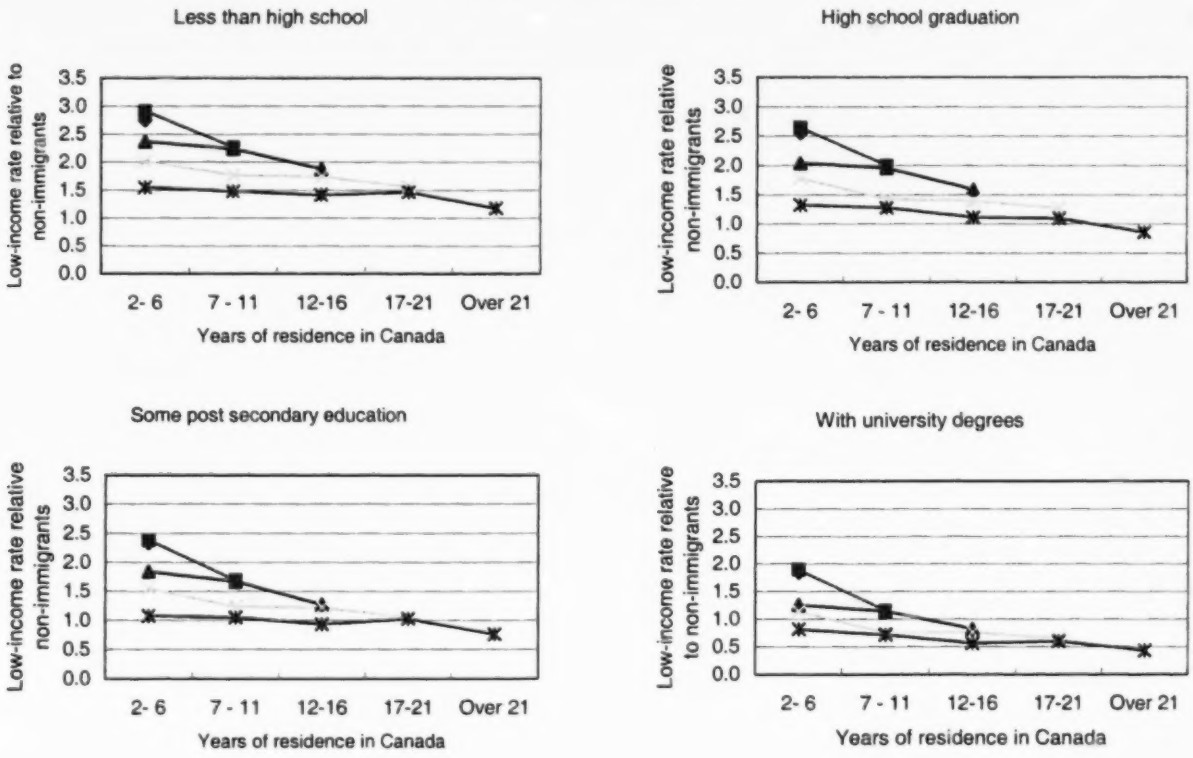
Figure 5. Relative Low-income rates of immigrants from various source regions by cohort and year of residence in Canada



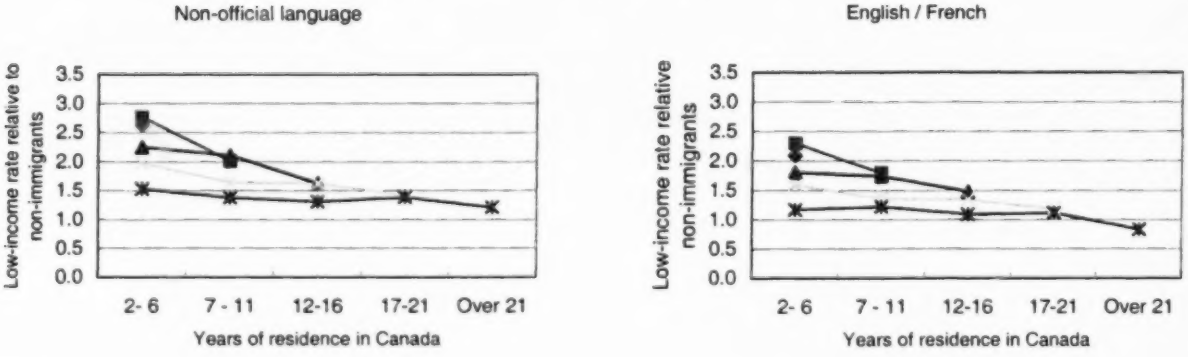
Data sources: the 1981 to 2001 Census 20% sample micro data

Figure 6. Relative Low-income rates of immigrants by education, home language, cohort and year of residence in Canada

By level of education



By home Language



Legend:

1995-2000 1990-1994 1985-1989 1980-1984 1975-1979

Data sources: the 1981, 1986, 1991, 1996, and 2001 Census 20% sample micro data

Appendix 1: How do Different Definitions of Immigrants Affect our Results?

To determine immigrant status, we treat Canadian-born children who are younger than 18 and live in an immigrant economic family as immigrants (family-based approach). Alternatively, we could simply base the classification on individuals' own immigrant status (individual-based approach). We believe that the family-based approach is more appropriate since young children usually have no independent income sources and have to depend on their families. The following highlights the differences in results from these two approaches.

Compared with the individual-based approach, the family-based approach increases the sizes of immigrants and low-income immigrants. The family-based approach yields lower low-income rates among immigrants in 1980, 1985, 1990, but higher rates in 1995 than the individual-based definition, although the differences are small (see Appendix Table 1). Consequently, the family-based approach reveals a more pronounced increase in the difference in low-income rates between immigrants and the Canadian-born. The family-based approach also allocates more of the increase in low-income population and low-income rate to immigrants than the individual-based approach.

Compared with the individual-based approach, the family-based approach produced higher low-income rates for some immigrant groups, but lower for others. While the difference in low-income rates from the two approaches was within the range of 0.5 percentage points for most immigrant groups, it was over one percentage point for three groups. Immigrants from Caribbean and from South and Central America had much higher low-income rates from the family-based approach (37.0% and 35.2%, respectively) than from individual-based approach (33.8% and 34.0%). In contrast, immigrants from East Asia had a lower low-income rate from the family-based approach (33.0%) than from the individual-based approach (34.6%).

Appendix Table 1 Comparing two definitions of immigrants in calculating low-income rates by immigrant status

	Immigrants				Low-income immigrants					
	Family based		Individual based		Family based			Individual based		
	size	percent in total population	size	percent in total population	size	low-income rate	percent in total low-income population	size	rate	percent in total low-income population
1980	4,684,562	20.0%	3,611,918	15.5%	797,798	17.0%	19.9%	632,636	17.5%	15.8%
1986	4,832,871	19.8%	3,760,132	15.4%	930,615	19.3%	20.4%	736,458	19.6%	16.2%
1990	5,092,901	19.7%	4,021,607	15.5%	869,944	17.1%	21.6%	691,839	17.2%	17.2%
1995	5,819,876	21.1%	4,692,943	17.0%	1,438,684	24.7%	27.3%	1,146,305	24.4%	21.8%

Data sources: the 1981, 1986, 1991, and 1996 Census 20% sample micro data

Appendix 2: Decomposition Methods

1. A standardization procedure

As a simple example, we can decompose changes in low-income rate among immigrants between 1980 and 1995 to three components: (a) changes in the mix of source regions; (b) changes in low-income rate for a given source region; and (c) the joint effect of (a) and (b). In Appendix Table 2.1, column (1) and (2) present the proportion distribution of immigrants by source region in 1980 and 1995. Column (3) and (4) present the low-income rate of each immigrant group in 1980 and 1995. Column (5) presents the difference in the proportion of each immigrant group between 1980 and 1995. Column (6) presents the difference in the low-income rate of each immigrant group between 1980 and 1995.

The contribution of compositional changes to the overall change in low-income rates is presented at the bottom of Column 7, which is the sum of the product between differences in group proportions between 1980 and 1995 (column 5) and 1980 group-specific low-income rates (column 3). The contribution of changes in rates is presented at the bottom of column 8, which is the sum of the product between differences in group-specific low-income rates between 1980 and 1995 (column 6) and 1980 group proportions (column 1). The joint effect of changes in composition and in low-income rate is presented at the bottom of column 9, which is the sum of the product between differences in proportions (column 5) and differences in group-specific low-income rates (column 6) between 1980 and 1995.

When calculating the contribution of compositional changes, or the "explained" component in mean-coefficient analyses, one could use 1995 group-specific low-income rates (rather than the 1980 values) as weights. In this case, the "explained" component would become 0.04385 (or 57%) rather than 0.00856 (or 11.1%) as weighted by 1980 group-specific low-income rates. This difference relates to the "joint" effect of changes in composition and rate. The difference between 0.04385 and 0.0085 equals 0.03529 (45.9%), the component due to the joint effect of changes in composition and rate.

In this example, the joint effect of changes in composition and rate has a larger contribution to the change in the overall low-income rate than changes in composition and changes in the rate do. Between 1980 and 1995, if there were no changes in group-specific low-income rates, the changes in the composition of immigrants' source regions would account for 11% of the increase in the low-income rate of all immigrants. If there were no changes in the composition of immigrants' source regions, the changes in group-specific low-income rates would account for 43% of the increase. However, both composition and group-specific rates changed, and immigrants from non-traditional source regions experienced large increases both in their shares of the total immigrant population and in their low-income rates. This joint effect of changes in composition and group-specific rates accounted for 46% of the increase in the low-income rate of all immigrants.

2. The Oaxaca-Blinder decomposition method

Suppose we have regression models $Y_1 = a + B_{1i}X_{1i} + E_1$ for time 1 and $Y_2 = a + B_{2i}X_{2i} + E_2$ for time 2 for the same set of variables measured at time 1 and 2. Assuming E_1 is the same as E_2, the contribution of compositional changes to differences in the means of Y_2 and Y_1 equals the sum of the differences in the means of X_{2i} and X_{1i}, weighted by B_{1i}. The contribution of changes in coefficients equals the sum of the differences in B_{2i} and B_{1i}, weighted by X_{1i}. The joint effect of changes in means and coefficients equals the sum of $(B_{2i} - B_{1i})*(X_{2i} - X_{1i})$. As shown in Appendix Table 2.2, the three components accounted for 11.1%, 43.0% and 45.9% of ΔY. The result is exactly the same as that from the standardization procedure.

If we used B_{2i} instead of B_{1i} to weight changes in means, the contribution due to changes in means would become 57%. Again the difference in the size of the "explained component" by using B_{2i} and B_{1i} as weights is the joint effect of changes in means and coefficients. Blau and Graham (1990) suggest that a large difference between B_{2i} and B_{1i} often results in a large difference in the size of the "explained component". However, if a large difference between B_{2i} and B_{1i} equally distributes among ΔXi, the size of the "explained component" will not be affected by the choice of the two weights. The choice between the two weights matters only when ΔB_i is highly correlated with ΔX_i.

When more than one independent variable was used, the OLS regression model will still produce the same results as the standardization procedure as long as the model includes all the possible interaction terms among the independent variables. For instance, we included source regions (12 categories + one reference group), recency of immigration (4 categories + one reference group), and their interaction terms (12x4=48) in the model. The contribution of changes in means, changes in the coefficients, and their joint effect to ΔY was 1.9%, 54.3%, and 43.8% respectively. These are the same as those from the standardization procedure. However, when the interaction terms were not included in the model, the contribution of changes in means, changes in the coefficients, and their joint effect was 15.9%, 60.9%, and 23.2% respectively. Thus, the contribution due to changes in means would be over-estimated here if the interaction terms were not included in the model.

3. The Even-MacPherson decomposition method

Based on logistic regression estimates, the average low-income rate for the study population at time 1 and time 2 are $Y_1 = \exp(B_{1i}X_{1i})/[(1+ \exp(B_{1i}X_{1i})]$ and $Y_2 = \exp(B_{2i}X_{2i})/[(1+ \exp(B_{2i}X_{2i})]$. The contribution of changes in means to ΔY equals $[\exp(B_{1i}X_{2i})/(1+ \exp(B_{1i}X_{2i}))] - [\exp(B_{1i}X_{1i})/(1+ \exp(B_{1i}X_{1i}))]$. The contribution of changes in coefficients to ΔY equals $[\exp(B_{2i}X_{1i})/(1+ \exp(B_{2i}X_{1i}))] - [\exp(B_{1i}X_{1i})/(1+ \exp(B_{1i}X_{1i}))]$. The contribution due to the joint changes in means and in coefficients cannot be derived directly from the regression parameter estimates because of the complex functional form. But it can be computed by taking the difference between the actual ΔY and the sum of the above derived contributions due to changes in means and in coefficients (i.e. the residual).

Appendix Table 2.3 presents the decomposition results. The direct effects due to changes on the B_s and changes in the X_s (composition) are estimated directly. The joint effect of changes in X_s and B_s is estimated as a residual, but it size is very close to that estimated using OLS, when this term was measured directly. When the logistic models include only one independent variable (source regions), the decomposition result is the exactly same as those from the standardization procedure and from OLS estimates. When the model includes both source regions and recency of immigration, but not their interaction terms, the contribution of changes in means, changes in the coefficients, and their joint effect was 15.9%, 59.7%, and 24.5% respectively. These results are very close to those from OLS estimates with the same model specification, but very different from those derived from the standardization procedure. When the logistic models included all the interaction terms between source regions and recency of immigration, the decomposition results become exactly the same as those from standardization procedure.

Appendix Table 2.1 An example of decomposition using the standardization procedure

Source regions	Composition: proportion in the total population (1) 1980	(2) 1995	Low-income rate: Group-specific low-income rate (3) 1980	(4) 1995	Changes in composition (5) =(2)-(1)	Changes in rates (6) =(4)-(3)	Components of change in overall low-income rate: due to composition (7) =(3)*(5)	due to rates (8) =(1)*(6)	due to joint effect (9) =(5)*(6)
North America	0.065	0.047	0.193	0.155	-0.017	-0.039	-0.003	-0.002	0.001
Caribbean	0.046	0.063	0.284	0.370	0.017	0.086	0.005	0.004	0.001
South & Central America	0.026	0.058	0.231	0.352	0.032	0.121	0.007	0.003	0.004
Northern Europe	0.243	0.149	0.148	0.125	-0.094	-0.023	-0.014	-0.005	0.002
Western Europe	0.132	0.087	0.133	0.149	-0.045	0.016	-0.006	0.002	-0.001
Southern Europe	0.227	0.152	0.167	0.184	-0.075	0.017	-0.013	0.004	-0.001
Eastern Europe	0.101	0.082	0.201	0.244	-0.019	0.043	-0.004	0.004	-0.001
Africa	0.025	0.047	0.150	0.345	0.022	0.195	0.003	0.005	0.004
South Asia	0.035	0.074	0.126	0.278	0.039	0.152	0.005	0.005	0.006
Southeast Asia	0.028	0.084	0.191	0.287	0.057	0.097	0.011	0.003	0.005
East Asia	0.048	0.107	0.178	0.332	0.058	0.154	0.010	0.007	0.009
Western Asia	0.015	0.040	0.257	0.465	0.025	0.208	0.007	0.003	0.005
Oceania & other	0.009	0.009	0.142	0.171	0.000	0.029	0.000	0.000	0.000
Total			0.170	0.247	0.077		0.009	0.033	0.035
Percent distribution of the three components					100.0%		11.1%	43.0%	45.9%

Appendix table 2.2 An example of the Oaxaca-Blinder decomposition method

Variables	Composition: Variable means (1) 1980	(2) 1995	Low-income rate: OLS regression coefficients (3) 1980	(4) 1995	Changes in means (5) =(2)-(1)	Changes in coefficients (6) =(4)-(3)	Component of overall change: due to composition (7) =(3)*(5)	due to rates (8) =(1)*(6)	due to joint effect (9) =(5)*(6)
Intercept			0.148	0.125		-0.023		-0.023	
North America	0.065	0.047	0.046	0.030	-0.017	-0.016	-0.001	-0.001	0.000
Caribbean	0.046	0.063	0.136	0.244	0.017	0.108	0.002	0.005	0.002
South & Central America	0.026	0.058	0.084	0.227	0.032	0.143	0.003	0.004	0.005
Western Europe	0.132	0.087	-0.014	0.024	-0.045	0.039	0.001	0.005	-0.002
Southern Europe	0.227	0.152	0.019	0.058	-0.075	0.040	-0.001	0.009	-0.003
Eastern Europe	0.101	0.082	0.053	0.118	-0.019	0.065	-0.001	0.007	-0.001
Africa	0.025	0.047	0.002	0.219	0.022	0.217	0.000	0.005	0.005
South Asia	0.035	0.074	-0.022	0.152	0.039	0.174	-0.001	0.006	0.007
Southeast Asia	0.028	0.084	0.043	0.162	0.056	0.120	0.002	0.003	0.007
East Asia	0.048	0.107	0.030	0.207	0.058	0.177	0.002	0.009	0.010
Western Asia	0.015	0.040	0.109	0.340	0.026	0.231	0.003	0.003	0.006
Oceania & other	0.009	0.009	-0.006	0.046	0.000	0.051	0.000	0.000	0.000
Total							0.009	0.033	0.035
Percent distribution of the components							11.1%	43.0%	45.9%

Appendix Table 2.3 An example of the Even-MacPherson decomposition method

Variables	Composition: Variable means (1) 1980	(2) 1995	Low-income rate: Logistic regression coefficients (3) 1980	(4) 1995	Changes in means	Changes in coefficients	Component of overall change: due to composition	due to rates	due to joint effect
Intercept			-1.752	-1.944					
North America	0.065	0.047	0.324	0.247					
Caribbean	0.046	0.063	0.826	1.409					
South & Central America	0.026	0.058	0.551	1.334					
Western Europe	0.132	0.087	-0.120	0.204					
Southern Europe	0.227	0.152	0.141	0.452					
Eastern Europe	0.101	0.082	0.371	0.810					
Africa	0.025	0.047	0.016	1.301					
South Asia	0.035	0.074	-0.186	0.987					
Southeast Asia	0.028	0.084	0.305	1.036					
East Asia	0.048	0.107	0.222	1.244					
Western Asia	0.015	0.040	0.689	1.804					
Oceania & other	0.009	0.009	-0.045	0.365					
Total							0.009	0.033	0.035
Percent distribution of the components							11.1%	43.0%	45.9%

Data sources: the 1981and 1996 Census 20% sample micro data

Note: Northern European immigrants are used as the reference group.

Appendix Table 3.1. Logistic regression results of the probability of an individual being in low-income among recent immigrants (<=5 years in Canada)

	1980		1990		2000	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Intercept	-1.781	0.046	-1.847	0.049	-2.290	0.064
Source regions						
North America	0.784	0.051	0.579	0.060	0.248	0.081
Caribbean	1.456	0.043	1.089	0.048	1.125	0.065
South & Central America	1.062	0.046	1.143	0.046	0.840	0.063
Western Europe	0.909	0.052	0.285	0.065	0.355	0.070
Southern Europe	0.355	0.048	0.111	0.053	1.094	0.063
Eastern Europe	0.674	0.059	0.792	0.047	0.828	0.061
Africa	0.779	0.052	1.129	0.048	1.606	0.060
South Asia	0.444	0.051	0.537	0.048	1.094	0.059
Southeast Asia	1.266	0.043	0.856	0.045	0.599	0.062
East Asia	0.837	0.046	0.718	0.046	1.631	0.059
Western Asia	1.211	0.051	1.626	0.047	1.867	0.060
Oceania & other	0.459	0.088	0.635	0.091	0.257	0.112
Home language						
not English/French	0.358	0.024	0.425	0.017	0.325	0.015
Education						
university degree	-0.957	0.032	-0.868	0.023	-0.595	0.018
some post-secondary	-0.622	0.023	-0.385	0.018	-0.147	0.018
high school graduate	-0.305	0.031	-0.193	0.022	-0.029	0.022
Family structure						
Unattached individual	1.417	0.033	1.213	0.025	0.973	0.024
2 adults, no kids	-0.102	0.026	-0.174	0.020	-0.252	0.017
Lone parents	2.283	0.063	2.202	0.040	1.675	0.033
Age						
<10	0.301	0.040	0.472	0.034	0.711	0.033
10-19	-0.036	0.041	0.347	0.035	0.733	0.033
20-29	-0.200	0.037	-0.020	0.032	0.308	0.032
30-39	-0.369	0.040	-0.079	0.033	0.246	0.032
40-49	-0.323	0.048	0.028	0.036	0.479	0.032
50-59	-0.295	0.050	-0.064	0.042	0.384	0.038

Notes: Reference categories for independent variables:
Northern Europe--Source regions,
English/French --Home language,
less than high school--Education,
2 adults with children- Family structure,
60 and over - Age.
Data sources: the 1981, 1996, and 2001 Census 20% sample micro data

Appendix Table 3.2: Logistic regression results of the probability of an individual being in low-income among recent immigrants (<=5 years in Canada), with interaction terms

	1980		2000	
	Coefficient	Standard error	Coefficient	Standard error
Intercept	-1.408	0.061	-1.826	0.138
Source regions				
North America	0.542	0.101	0.196	0.197
Caribbean	1.131	0.069	0.798	0.147
South & Central America	0.750	0.072	0.404	0.145
Western Europe	0.331	0.103	-0.127	0.205
Southern Europe	-0.088	0.067	0.585	0.149
Eastern Europe	0.444	0.102	0.659	0.155
Africa	0.438	0.095	1.635	0.147
South Asia	-0.214	0.082	0.547	0.139
Southeast Asia	0.974	0.067	0.302	0.145
East Asia	0.358	0.068	1.055	0.139
Western Asia	0.666	0.079	1.366	0.143
Oceania & other	0.341	0.131	0.373	0.211
Home language				
not English/French	0.370	0.024	0.321	0.015
Education				
University degree	-1.629	0.126	-1.291	0.186
Some post-secondary	-1.228	0.074	-0.601	0.158
High school graduate	-0.537	0.109	-0.565	0.216
Family structure				
Unattached individual	1.412	0.033	0.972	0.024
2 adults, no kids	-0.112	0.027	-0.256	0.017
Lone parents	2.283	0.063	1.671	0.033
Age				
<10	0.299	0.040	0.693	0.033
10-19	-0.044	0.041	0.711	0.033
20-29	-0.208	0.037	0.290	0.032
30-39	-0.375	0.040	0.229	0.032
40-49	-0.330	0.048	0.463	0.033
50-59	-0.285	0.050	0.383	0.038
Interaction terms				
North America *University degree	0.239	0.171	0.036	0.258
North America *Some post-secondary	0.650	0.129	0.113	0.231
North America *High school graduate	0.120	0.176	0.169	0.308
Caribbean*University degree	0.690	0.191	0.664	0.219
Caribbean*Some post-secondary	0.497	0.097	0.252	0.174
Caribbean*High school graduate	0.238	0.140	0.347	0.236
S.C. America*University degree	0.541	0.173	0.841	0.200
S.C. America*Some post-secondary	0.615	0.100	0.369	0.171
S.C. America*High school graduate	-0.241	0.153	0.457	0.235
Western Europe *University degree	0.847	0.191	0.618	0.254
Western Europe *Some post-secondary	0.872	0.125	0.594	0.226
Western Europe *High school graduate	0.623	0.194	0.112	0.321
Southern Europe*University degree	1.081	0.211	0.590	0.204
Southern Europe*Some post-secondary	0.701	0.105	0.545	0.173
Southern Europe*High school graduate	0.653	0.148	0.760	0.231
Eastern Europe *University degree	0.468	0.186	0.400	0.201
Eastern Europe *Some post-secondary	0.432	0.134	0.166	0.177
Eastern Europe *High school graduate	-0.089	0.204	0.168	0.241
Africa *University degree	0.584	0.175	0.050	0.197
Africa *Some post-secondary	0.612	0.123	-0.042	0.170
Africa *High school graduate	0.101	0.179	0.191	0.231
South Asia *University degree	1.190	0.158	0.968	0.189
South Asia *Some post-secondary	1.164	0.116	0.430	0.163
South Asia *High school graduate	0.394	0.167	0.592	0.221
Southeast Asia *University degree	0.406	0.144	0.497	0.196
Southeast Asia *Some post-secondary	0.456	0.091	0.265	0.170
Southeast Asia *High school graduate	0.261	0.131	0.364	0.233
East Asia *University degree	1.175	0.149	0.832	0.188
East Asia *Some post-secondary	0.726	0.096	0.688	0.162
East Asia *High school graduate	0.301	0.138	0.619	0.220
Western Asia*University degree	1.281	0.169	0.708	0.193
Western Asia*Some post-secondary	0.915	0.115	0.538	0.167
Western Asia*High school graduate	0.268	0.154	0.733	0.226
Oceania*University degree	-0.400	0.445	-0.736	0.434
Oceania*Some post-secondary	0.183	0.195	-0.285	0.271
Oceania*High school graduate	-0.012	0.297	-0.101	0.408

Data sources: 1981, 1996, and 2001 Census 20% sample micro data

Appendix Table 3.3. Logistic regression results of the probability of an individual being in low-income, Canada, with pooled data from 1981, 1986, 1991, 1996, and 2000 Census

	Coefficient	Standard error
Intercept	-2.2335	0.0043
Cohort[1]		
1995-99	-1.5776	0.0605
1990-94	-0.6104	0.0208
1985-89	0.2200	0.0152
1980_84	0.1185	0.0124
1975-79	0.0349	0.0109
1970-74	-0.0637	0.0104
before 1970	-0.1561	0.0131
Year since immigration[2]		
myearsim	0.0018	0.0004
myearsim squared	0.0001	0.0000
Source regions[3]		
North America	0.0677	0.0115
Caribbean	0.6591	0.0108
South & Central America	0.4212	0.0110
Northern Europe	-0.2719	0.0103
Western Europe	-0.0938	0.0102
Southern Europe	-0.1277	0.0102
Eastern Europe	0.0773	0.0102
Africa	0.6481	0.0114
South Asia	0.1769	0.0108
Southeast Asia	0.1788	0.0108
East Asia	0.4026	0.0106
Western Asia	0.9953	0.0113
Oceania & other	-0.0179	0.0166
Home language		
not English/French	0.4579	0.0028
Education		
University degree	-1.6754	0.0024
Some post-secondary	-0.9019	0.0014
High school graduate	-0.6973	0.0019
Family structure		
Unattached individual	1.7669	0.0018
2 adults, no kids	-0.3185	0.0018
Lone parents	2.3235	0.0021
Age		
<10	0.4752	0.0027
10-19	0.1703	0.0025
20-29	0.3199	0.0022
30-39	-0.0893	0.0024
40-49	-0.2013	0.0024
50-59	-0.0535	0.0024
interaction b/w ysm & cohort		
yc95_99	-0.1908	0.0042
yc90_94	-0.1299	0.0015
yc85_89	-0.0308	0.0011
yc80_84	-0.0292	0.0009
yc75_79	-0.0148	0.0007
yc70_74	-0.0029	0.0007
Unemployment rate in the census year	0.0744	0.0004

Notes: 1. Canadian-born is the reference group for cohort
2. for Canadian born myearsim=0, for immigrants myearsim= ysm -mean of ysm
3. Canadian-born is the reference group
for the reference group for other variables, see Appendix Table 3.1

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